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ORKNEYS AND SHETLAND.

BY

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There is perhaps no region, so easy of access to the European traveller, that offers more fresh and varied interest than the group of islands lying north of Scotland. The student of natural science can follow there in the steps of Hugh Miller and, with his geological hammer and chisel, force open the stone tablets whereon the sea life of a remote past has left its records. The archæologist, who has not made beforehand a special study of this locality, will be amazed at its wealth of rude prehistoric monuments, and the hamlets are so sparsely scattered, the isolated farms so few in number, that it is not hard to think away the present and live for an hour amidst the moving life of the ages and races now extinct. The lover of the wild and the picturesque in nature can gratify also his predilections, without renouncing the nightly shelter and the daily refreshing offered by simple and comfortable hostelries.

The Pentland firth, that separates the Orkney islands from Scotland, is less than nine miles in width at its broadest point opposite Hay, while Duncansbay head,

STROMNESS, ORKNEY.

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Scotland's northeastern cape, is only about six miles distant, from the nearest point of South Ronaldshay (Rognvald's island) the southernmost large island of the group. Mid-channel lie the smaller islands of Stroma and Svona and the rocky islets known as the Pentland Skerries. The actual separation of the archipelago from Scotland is thus insignificant, but the tides that sweep through this narrow channel and between the islands have a royal movement and, if they run counter to the wind, a mighty tussling ensues.

One familiar with Orcadian gales describes them thus: "All distinction between air and water is lost, the nearest objects are obscured by spray and everything seems enveloped in a thick smoke. Upon the open coast, the sea striking upon the rocky shores rises in foam for several hundred feet and spreads over the whole country; . . . rocks of many tons in weight are lifted from their beds; the roar of the surge may be heard for twenty miles; the breakers rise to the height of sixty feet."*

Under ordinary conditions, however, the passage across from Thurso, Scotland, is only a somewhat protracted ferriage and the swaying of the ocean-floor only sufficient to add zest to the few hours' voyage.

The traveller, therefore, who is imbued with the customary ignorance of geographical details, is surprised and delighted on rounding Duncansbay head to find, instead of a barren turbulent channel some 50 miles in width, the sea in front blossoming as it were immediately into foam-encircled islets, while the whole horizon to the north is crowded with larger islands, separated the one

*"The Orkneys and Shetland," by John R. Tudor, p. 198.

from the other by winding passages of inconsiderable dimensions.

There are said to be 56 islands in the Orkney cluster, of which 30 are inhabited. Hardly one fourth of the islands however are large enough to rank as independent members of the group. The largest island, called "Pomona"* or "The Mainland," is, to judge by the eye, equal in dimensions to the combined area of all the other islands. Its greatest length is approximately 25 miles and breadth 15 miles. The main axis of the group is N. E. and S. W. of the mainland and several of the other larger islands N. W. and S. E.

The characteristic feature of the Orkney group of islands is the low rounded central ridge, sloping gradually on both sides to the sea. The upper courses of the hills are brown with a dense growth of heather, the lower occupied by farms.

The brown unreclaimed land however often holds apparently the entire slope from crest to shore-line.

There is a vivid suggestion here of the clearing, where tillage and meadow-land are steadily sturdily making inroads upon the original domain of the forest.

†Here the earlier tenant was of course the heather, for trees do not grow in the islands, save in especially favored localities, or where artificially cultivated, and do not therefore form a feature of the landscape. And, if we may trust the old Norse records, there were no forests in the islands at the time of their conquest by

* Called Hrossey, horse-island, by the Norsemen.

† In the Heimskringla, (edited by Unger) page 69, we read "He (*i. e.*, Einar) was called Torf-Einar because he caused peat (torf) to be cut and used as fire-wood; for there was no wood in the Orkneys."—Einar was one of the first Orkney earls.

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Harald the fair-haired, King of Norway (close of 9th century).

Among the southern islands, Hoy (Há-ey—high island) is the most picturesque. Its bold, precipitous sea-walls of old red sandstone and its solitary rock pillar 450 feet in height, known as the "Old Man of Hoy," give to it a place apart among the islands of the group. Its rough-hewn shore line is one of the boldest and most interesting formations of that character in Great Britain.

My own impressions of the Orkney islands as a group are derived from a sunset-glimpse north and south from the vantage ground of Wideford hill (740 feet high), back of Kirkwall, the capital of the Orkneys, and from a delightful summer afternoon sauntering on shipboard northward, with the islands to east and west almost within hailing distance.

Yet, in a broad sense, to have seen one island is to have seen all; the general features are the same; though some of those to the north are so low lying, that it is difficult to determine from a near distance where the line of demarcation between sea and land is drawn.

The first outlook from one of nature's sentinel towers over an unfamiliar landscape is not soon forgotten. I shall always remember the magnificent sense of being poised mid-air, that came when, having gained the crest of one of the higher peaks in the western Adirondacks, nothing met my eyes but close pressed forests, with lakes dotted here and there and the long lines of hills, wearing still their native garb.

The Orkney hill-top was gained about nine o'clock

of a July evening just after sunset. There was no dazzling glare of horizontal rays in the west to bewilder the vision, and no clouds save in the north to veil the landscape. Island behind island, the archipelago lay strewn about me, with darkening stretches of blue and black water between, roosts, as the islanders call them, or swift tidal races. The northern peaks of Scotland, Morven and the hills of Sutherland, softened by the paling light into cloud mountains, limited the view southward.

The monuments of the prehistoric races, tumuli, isolated monoliths and stone circles, stretched from the foot of the hill westward across the mainland in an interrupted chain.

I had but to turn to my companion, a canny Orkney-man, combining the grocer, the baker and the archæologist, to realize fully the present conditions here under the influence of Scotch thrift; while the darkening tidal-ways vividly recalled the strong cruel age of the Vikings, and the stones of Stenness, dimly outlined against the western sky, spoke of the half mythical, half historical Pictish traditions.

As one leaves the Orkneys behind, ere the last lighthouse on the northernmost sand-spit is lost to view, an island is seen far to the north-east. Fair island (Fritharey—Island of peace, according to the Saga) lies about midway between the Orkneys and Shetland, being some twenty-five miles distant from each group. It is, however, considered as belonging to the latter. Its shores are seldom visited, though mail-steamers pass almost daily within a few miles of its cliffs.

There is thus no severing of the land-tie upon this

northern journey, since, before Fair-isle is reached, the southernmost promontories of Shetland-mainland come into view and soon, far away to the west, the bold beautiful form of Foula (Norse Fogl or Fugl-ey, bird-island) the outlying member of the Shetland group. When about 9 P. M. we came abreast of Sumburgh-head, Shetland's southeasternmost cape, all of nature's manifestations were attuned, as it were, into harmony with the bolder landscape. The air was more cold and crisp, the sea more masterful; there was a sense of power pervading everything, every buffet of the wind, every swell and toss of the wave. The Norsemen called this stretch of sea betwixt Fair-isle and Shetland Dyn-röst, the dinning or thundering race.

Shetland is said to consist of about 100 islands, great and small. Here however, more markedly even than in the Orkneys, one island predominates. The Mainland, so-called, *i. e.*, the main island, is according to Tudor, some 70 miles in length, by 30 in its greatest breadth.

Its coast is however so cleft by fissures of varying width, that no part is more than three miles distant from the sea. Beside the mainland and the isolated islands, Foula and Fair-isle, only Unst, Fetlar and Yell properly rank as independent members of the group.

The main axis of this group is north and south, slightly N. E. and S. W., of the more important islands the same. All the islands with the exception of Fair-isle and Foula are so closely massed, as to seem parts of one whole. The extreme north and south dimension of the group between Sumburgh head and Muckle Flugga light-house is, according to my measurements,

seventy miles. From Muckle Flugga light-house to Duncansbay head, Scotland, is about 150 miles, while the north and south measurement of the Orkneys gives about fifty miles.

The northern group differs in almost every particular from the southern, from the character of its rock-formations to that of its people. Those who have explored the western coast with its numberless fissures, geos, voes, wicks and firths* describe the Shetland coast-line as a miniature Norway. My own observation extends only so far as the vision can reach from hills near Lerwick, the capital, and from excursions on foot and in *machine* south and west of that point.

To one familiar with Norway, the Faroes and eastern Iceland, the physical contours of the Shetland group afford a distinct reminiscence of the still bolder, and more impressive scenery of northern Scandinavia. The dorsal ridge of the Shetland islands is sharp, not rounded as in the Orkneys. The upper courses of the hills are usually clothed with heather, but not infrequently bare of vegetation, either through denudation, or because the turf has been stripped off for fuel. At the base of the angle of sharp descent, there is a black peat deposit sloping far down toward the sea-line.

Only a narrow fringe of farm-land, green meadow and garden extends along the coast. There is thus no suggestion here, as in the Orkneys, of a fruitful effort on the part of man to redeem nature's waste-places. The struggle under normal conditions would be indeed apparently hopeless. In valleys back from the sea, how-

* Voe, a long narrow bay (Norse Vágr); geo a rocky creek or inlet (Norse Gjá= a rift); wick an open bay (Norse Vík).

ever, notably in Tingwall, the garden of Shetland, the natural conditions are more favorable to agriculture; but, so far as my observation reaches, the Shetland tenant farmer or crofter must look almost entirely to the sea as his source of support. It is a common saying in the islands, that the Shetlander is a fisherman owning a small farm, the Orkneyman a farmer owner of a fishing smack.

While the general impression received from the Orkney islands is that the condition of the farming class is one of comparative comfort, the reverse is true of the Shetland islands. Nature has built here a strong bulwark against the storms of the North Atlantic, and, whether she smiles or frowns the traveller can share her mood and draw rich inspiration therefrom, but not so the crofter. The meagre strip of tillable land is furthermore accursed by the dower of mediæval conditions and, from the humanitarian stand-point, it is a mournful sight to observe how here, as in a considerable section of enlightened Great Britain to-day, the masses are still enslaved.

The distinctive characteristics of Shetland life cannot be seen until the towns have been left behind. No matter how remote from the highways of the world's commerce and pleasure travel be the land visited, the cities are found to have exchanged in some degree, at least outwardly, their indigenous qualities for a certain cosmopolitan veneer. Even Reykjavik, Iceland's capital, forms no exception.

Leaving the towns behind then and sauntering along the highways or across fields, we observe the seaward slope of the hills scantily dotted with little clusters of grimy

stone cottages, repellent enough, but not more uninviting than the typical crofter's-house in northern Scotland or in the Hebrides. Rude dykes separate each group of cottages from the scathold or pasture land outside, Such a cluster of crofts is called a *toon*, or town, a transition stage in the evolution from the Old Norse tún (pronounced toon), a single enclosed holding, to the English

CROFTERS' COTTAGES NEAR LERWICK, SHETLAND.

town. The section of arable land within the dykes, belonging to each crofter, is usually distinctly separated from that of his fellows though, rarely, the whole is cultivated in *runrig*,* that is, in common. The separate holdings vary from three to ten acres. Oats, bere (a kind of barley) and potatoes form the principal crops.

* Land of different tenants is mixed up in alternate ridges or furrows.

The grass growing along the drains that intersect the fields, and a few chance green wisps in the meadows furnish the only hay crop. Each crofter has, beside his section of arable land within the dykes, unlimited right of pasturage in the scathold or hill-pastures held in common by several tenants. The domestic animals, cattle, sheep and horses, are all Scandinavian in origin and diminutive in stature.* The famous Shetland pony, with the introduction of roads, is disappearing; a breed of greater draught-power, such as the Welsh pony, or even the horse, taking his place.

According to Tudor*: "the crofter's cottage was formerly a windowless, chimneyless cabin, to reach which you had to pass through the *byre*, or cattle-shed, that was separated from the human habitation only by the box-beds, that served as resting places for the higher animals." At present, however, the *byre* is usually distinct from the crofter's cottage. This latter consists of two apartments, the *but* and *ben*. The *but* has no floor save the bare earth. There is a fire-place in the centre, but no chimney for the escape of the smoke. The *ben* is generally floored and its fire-place furnished with the added luxury and extravagance of a chimney. The furniture is of the rudest character, consisting of chairs, stools, a wooden sofa, perhaps, and the box-beds. Above the *but* and the *ben* there are rude cock-lofts.

Personally, I visited only a single crofter's-house, lured thither by the bait of deftly woven Shetland shawls and the grandmotherly persuasions of a wily peasant woman. Had I not mother, or wife, or child, who were expecting some woolly mementoes of my Shet-

* See Tudor's Orkneys and Shetland, chap. XII.

land pilgrimage? Were my feet and fingers not aching to be enwrapped within the warm meshes of Shetland socks and mittens? The home was far more comfortable than the typical crofter's house just described, but this greater luxury might be explained by the sybaritic influence of the neighboring capital.

A characteristic feature of the rural districts of Shetland is the rude mill. Where walls of rock enclose conveniently a descending brooklet, the Shetlander poises his tiny mill. It is just large enough to spread a roof over the slowly circling stone and allow the peasant miller to sit idly beside it. A stout vertical shaft, riveted to the upper mill-stone, passes through an aperture in the lower. A number of rude boards are jointed to its base, at such an angle as to receive and communicate to the upper stone the momentum of the water. The optical effect is that of a wheel, whose spokes are revolving upon the same plane with the stream, instead of at right angles to it.

A Shetland landscape, when mists, dense with vapor almost as the clouds, are dragging their cold dripping folds over bare hill-side and black moorland, is desolate in the extreme. The thatch resembles straw, that has been rotting in the compost heap. The stone huts are dripping at every projecting angle of their dingy walls. The smoke escapes apparently quite as much by the door ajar as by the hole in the roof, rudely fashioned or not into some semblance to a chimney-pot. The peat-bogs, cut with deep black pits and trenches, reek with oily exhalations. A few gaunt sheep are pasturing by the road-side. Women are seen, crofter's wives and daughters, rearranging the peat-stacks, that line the

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trenches, or bending low down under their over-filled peat baskets the while their fingers ply perhaps the knitting needles. Men are rarely seen at work, save at intervals a forlorn-looking cowherd. The passer by receives the distinct impression that incapacity, through age or feebleness, has doomed this individual to so unmanly an occupation. It is said indeed by those familiar with the islands, that the men leave the greater portion of the work ashore to their industrious wives and daughters.

But, forget, if you can, the miserable conditions of the crofter's lot and, crossing one of the swift tidal races, that separate the outer islets from the mainland, climb the Noup of Noss.

The ferryman, who has piloted you across the 100 feet or more of water, has had a hard struggle with the swiftly rolling waves, that threatened in their splendid rush to carry boat and all far out to sea. The promontory (Noup, Norse gnúpr, a peak or promontory) slopes gently up from the landside, but the sea has torn away its eastern slope and is undermining the foundations of the western. On all sides it is cut in rough sheer precipices from crest to shore-line, and beneath has been honeycombed by the breakers. This is the home of the sea-birds and the fog-sprent air their natural element. In grand, strong spirals of flight, inward and outward, upward and downward, move the grey and white gulls. You bend over the cliff and, 500 feet and more below* other circles are coiling in and out among the pillared caves, while the water is dotted as with some shimmering winged insect-life. To northward and southward,

* Height of headland 592 feet.

Shetland's capes, appearing, disappearing, reappearing, stretch their gaunt grey arms far out into the sea. The kiss of the storm is upon your cheek, the cries of the storm-birds and the blended roar of the wind and the surf in your ears. Out of such elements as these was formed the warp of northern poetry and the sunlight, that shall fill to-morrow this strong, desolate world with its burnished rays, furnished the woof.

I discovered during my stay in the Orkneys nothing in the conditions of the farming class, that was so unhackneyed and suggestive, as that everywhere present in Shetland. The Orcadian peasant's house, while rude and primitive, bears outward testimony to thrift and internal comfort. The picturesque desolation of the black, sodden Shetland moors and wretched *toons* is entirely absent. The Orcadian peasant seems also more prosperous, more alert than the Shetland crofter. Those,* however, who have seen the Shetlanders at the *haaf*, or deep-sea fishing stations, describe them as physically a magnificent race of men, distinctly Norse in type, tall, fair-haired and blue-eyed. The sea is indeed the element that should attract and develop the highest type of Shetland manhood.

Tudor's testimony fully confirms my own impressions with regard to the prosperity of the Orcadian peasantry.† "The Orkneys, at the present time (1883)," he says, "are probably as thriving as any portion of Her Majesty's dominions. During four months spent in wandering to and fro in the islands, in 1880, the writer never once saw a bare-footed man, woman or child, nor

* Tudor, page 161.
† Tudor, page 107.

was he once accosted by a beggar. Bankruptcy among the farmers has never been known and over a million (pounds) was stated to be lying on deposit in the banks, to the credit of the farmers and peerie (petty) lairds."

The cities of Orkney and Shetland consist mainly of single, narrow, winding streets following the coast-line. These are paved usually with broad slabs and lined with houses of varying height, architecture and age, none, however, or the fewest, offering especial interest.

I found the better class of the citizens intelligent, well-informed and hospitable. The Orkney man seems in every respect a Scotchman, while the Shetlander has not altogether lost the imprint of the Norse colonization. The Scandinavian language, as I was informed, survived in remote districts of Shetland until a recent period. The population of the Orkneys in 1881 was 32,037 souls; of Shetland, 29,709;* of Kirkwall, 3,923; of Lerwick, 3,500. The acreage under cultivation in the Orkneys was 108,795 acres; in Shetland, 58,437; under grain, Orkneys, 38,294 acres; Shetland, 10,774. (Total acreage of Orkneys and Shetland, 598,726.) Average yearly temperature at Bressay opposite Lerwick, Shetland, 45.4° (Fahrenheit); at Kirkwall, Orkneys 45.9°. Average August temperature, hottest month, 54.8° in Shetland (Bressay); 54.7° Orkneys (Kirkwall); January, coldest month, 38.9° Shetland; 38.6° Orkneys.

The history of these islands is interesting. Originally they were inhabited by Pictish tribes, who were converted to Christianity, probably by some of the followers of Golumba, that famous saint who, in the sixth

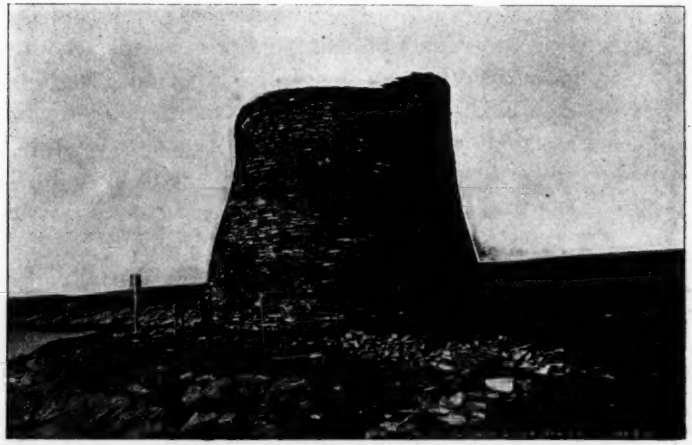
* In 1831, Orkneys, 28,847; Shetland, 29,392. 1861, Orkneys, 32,395; Shetland, 31,670.

century, founded a cloister in Iona and became the apostle of the Picts. Toward the close of the eighth century, Norse vikings began to establish themselves there, the islands offering a convenient centre for their piratical expeditions north and south. In the following century, Harald the fair-haired reduced all of Norway under his sceptre. At this time the great emigration to Iceland took place. A large number of Harald's enemies sought refuge in the southern islands and from thence were ever returning to harry Norway. Harald resolved to rid his coasts of this scourge and undertook, therefore, an expedition (880–84) against the islands, that resulted in their union with the Norwegian crown. The islands remained under Scandinavian control, governed vicariously by earls or directly by the crown, until 1468. Denmark, Sweden and Norway formed at that time one kingdom. A dispute had arisen betwen Christian the First, king of the three northern states, and James the Second, of Scotland, and it was agreed to settle it by the marriage of Margaret of Denmark and the heir of the Scottish crown. To offset the dowry given by James, Christian pledged first the Orkneys and then Shetland to the Scottish crown, with right of redemption. The forfeit money was never paid and the islands remain *de facto* a possession of the kings of Great Britain. The history of the islands, during the Norse period, is full of dramatic interest and no one should visit that archipelago, whose nomenclature and memories are so entirely Norse, without first reading the record contained in the Orkneyinga Saga.

But there is a more remote and mysterious civilization than the Norse, whereof these islands guard rich

vestiges. It is generally agreed that the rude prehistoric monuments found here are the work of Pictish peoples, although some authorities (not the best nor the most numerous) would assign to the Norsemen the round stone towers.

The prehistoric monuments of the Orkneys and Shetland, consist of the brochs, or circular towers; the stone-circles and isolated standing stones; the cham-



BROCH OF MOUSA, SHETLAND.

bered mounds or cairns; the underground dwellings, styled variously eirde-houses, weems or hypogea, and the burial mounds or barrows.

The best specimen of the first of these structures is found in the Shetland islands, and is known as the Broch of Mousa. (Of 374 known broch-sites, 75 are in Shetland, 70 in the Orkneys, and 139 in the two northern counties of Scotland, Caithness and Sutherland.)

The broch is a hollow circular tower of dry-built masonry, with an exterior diameter varying from 70 to 40 feet. The mean height of the brochs, according to the best authorities, was about 50 feet. From without, it presents an unbroken surface, the only aperture being the low entrance to the interior court.

In certain cases, the tower was protected by outworks. The broch of Clickemin, *e. g.*, stands upon a holm or islet in a fresh water loch, just outside of Lerwick. A long narrow land spit, or causeway, leads from the shore to the islet, and over this a covered guarded passage seems to have been carried, affording the only entrance to the broch. The entire islet was surrounded by a strong wall of circumvallation, and still further protected by a guard-house, in the form of a segment of a circle, placed on the land-side between wall and tower.

The thickness of the walls of a typical broch is about 15 feet. Up to a height of 8 feet, the wall is solid save where space has been left for 2 or 3 oblong chambers, with rudely vaulted roofs, connecting with the central court. Above the height of 8 feet, the wall divides into two sections with an interspace, some 3 feet in width. Here a gallery, formed of stone-slabs, encircles the tower between inner and outer wall. This gallery connects by a flight of steps with the court below and is lighted at regular intervals by openings pierced in the inner wall. There are several tiers of these galleries, varying in height from 5 to 6 feet. The flight of steps leading to the higher gallery forms, in every instance, a solid partition wall in the lower tier. These towers do not seem to have been either

roofed or floored, and the purpose and period of their construction can only be conjectured.

Save for the brochs of Mousa and Clickemin, the archæological interest of the islands, however, centres distinctly in the southern archipelago.

From Scapa in the south-east of the mainland, Orkneys, to Skail in the west, there is almost a continuous line of interesting prehistoric structures. "Nowhere else," says Tudor, "upon British soil are found so many relics of the prehistoric past, as in the six or seven miles of Orcadian soil, which commence with the chambered mound of Maeshowe and end with the weem of Skara Brae."

I was initiated almost immediately, upon my arrival in the Orkneys, into the mysteries of local archæology. A stone's throw below the crest of Wideford hill, there is a chambered mound, that was opened some forty years ago. After sunset, we descended the slope and my Kirkwall friend guided me to the edge of a pit, half filled with stones, thrown in by idle urchins.

We had soon cleared the pit, and my companion, lying prone upon the ground, pushed himself feet foremost under a projecting slab and disappeared in the darkness, bidding me follow. I did so, though not without difficulty, and, by the light of a match, saw that we were in a small vaulted chamber of beehive construction, some 6 feet in height. Originally a low narrow passage, 15 inches high and 22 broad, led from without to a central chamber (the pit we first entered) and, from this in turn, other similar passages to 3 or 4 side chambers. The whole masonry was then covered by a mound of earth. A similar principle of construction

obtains in all the chambered Orcadian mounds of which Maeshowe is at once the most conspicuous and the best preserved. It is assumed, that these mounds were used as dwelling places and the narrow dimensions of the passages have either given birth to the tradition, or served to corroborate it, that the Picts or *Pechts* were a race of dwarfs. Tudor is unaware of the existence of any chambered mounds in the Shetland islands.

Wideford hill and my friend's rich archæological collection, with its spoils from brochs, chambered mounds and barrows, opened pleasantly and suggestively for me the volume of Orcadian antiquities. On the following day, taking the *machine* from Kirkwall, I dismounted half-way between the 9th and 10th mile post. There, with Maeshowe, begins that unique file of rude prehistoric monuments. In my own experience, I know of nothing comparable, in vivid suggestiveness of a remote past, to this walk, unless it be the stroll along the Via Appia to the tomb of Cecilia Metella and beyond, or the ride from Naples to Cumæ. Indeed, the Latin civilization, on account of its closer kinship with our own, seems less remote in time than that prehistoric northern life.

Maeshowe, or the maiden's mound, as it has been translated, was formerly known to the Orcadians by the euphonious name of "the abode of the Hog-boy." Hog-boy, however, is simply a perversion of the Norse *Haug-búi* or mound dweller. It is an imposing mound, 36 feet in height by 92 in diameter, and stands in the centre of a circular platform, 270 feet in diameter. This is in turn surrounded by a trench 40 feet wide, and from 4 to 8 feet deep. A covered passage, 54 feet in

length, conducts to the central chamber. This passage can be traversed with comparative ease in a stooping posture. The central chamber is spacious, and the side chambers are reduced to mere pockets in the walls, varying in height from 3 feet 4 inches, to 3 feet 6 inches. There are various rune-scratchings and other Norse inscriptions, such as a dragon and a worm-knot, traced upon the walls, indicating that the mound was frequently visited by the Northmen. It was called by them Orkahaug* (perhaps connected with old Norse Orka, to be strong to work, and meaning the strong howe).

On returning to the road, we are soon arrested by a tall monolith, rising in the midst of a field of grain, one of the many isolated standing stones scattered about the islands. Whether these were intended to serve as way-marks, as memorials of the dead, or for some devotional purpose, is uncertain. A half mile further, we reach the stones of Stenness (stone promontory), the first of three stone circles† standing in close proximity. It consisted originally of a low truncated mound, some 3 feet high and 104 feet in diameter, surrounded by a broad ditch, and this in turn by an embankment. Only three of the original circle of stones remain, two erect, one, the largest, prostrate. Its dimensions are 19 feet by 5 feet, by 1 foot and 8 inches. Its weight is conjectured to be 10.71 tons. On the western side of the circle are the remains of a cromlech.

About 150 yards north of the ring of Stenness, stood

* Orkneyinga Saga, p. 187 ; edited by Gudbrand Vigfússon.

† There are 5 stone circles in Shetland, 3 in Unst, 2 in Fetlar, but they are composed of smaller stones laid flat on the ground.

formerly a monolith, similar to the others, but with a hole cut through it near the centre. This was called the Stone of Odin, and played quite an important rôle in the local customs and traditions. This stone together with three others, forming part of the Ring of Stenness, is said to have been converted in 1814 by a tenant farmer, a foreigner, into rubble wherewith to construct byres or cattle sheds. The firm hand of the law inter-

STONES OF STENNES, ORKNEY.

vened to check the vandalism, and the fellow was so thoroughly boycotted by the indignant peasantry that he left the country.

From the stones of Stenness, the path slopes down to the Bridge of Brogar, a narrow causeway between two broad fresh-water lochs, Stenness and Harray. At the eastern end of the bridge, as I passed, workmen were demolishing what appeared to be a prehistoric mound,

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in order to use the material for broadening the causeway. Close to the bridge, rises the solitary monolith, known as the Watch-Stone (16 feet in height,) and it is well named. It seems to stand as a sentinel at the entrance of some primeval Holy of Holies. For when the bridge is passed, tumuli abound on every side, and in the centre rises the circle of Brogar. Thirteen slabs are still erect, 10 lying prostrate, out of perhaps 60 that composed the original circle. Their average height is 9 feet, the tallest being 13 feet 9 inches in height above the ground. The diameter of the circle is 340 feet, and this is surrounded by a broad and deep moat crossed at east and west by narrow causeways. In the centre are the remains of some structure, perhaps a cromlech.

Orcadian peasants formerly called the Ring of Brogar the temple of the sun, and that of Stenness, the temple of the moon. On the first day of each new year, there was a gathering of the country folk at the Kirk of Stenness, near the stone of Odin. In feasting and dancing the hours and days sped. Naturally, in the unwonted rest from toil and boisterous merry making, the god of love found and improved his opportunity. When the hearts of man and maid were finally agreed, setting forth together from the company of their kinsfolk and friends, they sought the temple of the moon. There, in the man's presence and hearing, the maiden knelt and prayed to Odin to help her to be faithful to her lover. Thence to the temple of the sun, where the man in his turn besought the succor of the higher powers. Finally, their hearts and minds confirmed by this consecration in wish and purpose, they went to the stone of Odin and, standing, one on one side, the other on the other,

clasped hands through the aperture and swore a solemn oath to be faithful each to the other.

Though it was a sacrilegious and despicable thing to break such an oath, it is reported that another custom, equally valid, facilitated the loosing of a tie thus solemnly contracted, if subsequently proven irksome. Husband and wife betook them as before to the Kirk of Stenness and then separated, the one going out by the north door, the other by the southern, to single blessedness, or to second nuptials, as they chose.

A mile more of the roadway passed brings us to the Ring of Bukan, a circle of a similar character to Stenness and Brogar, but of smaller dimensions. Here all traces of the monoliths, if any once existed, have disappeared. Thence we may saunter on for several miles, with nothing but the backward look to suggest the past, and exchanging greetings with the wayfaring peasants, catch a few glimpses of Orcadian life and thought. A farmer is repairing his stone hut with slabs of old red sandstone quarried not far away. While we are sitting upon his door-step for a brief quarter of an hour, questioning and questioned, he brings forth from within doors specimens of fossil-fishes, ichthyolites, that would kindle envy and delight in any geologist's eyes.

Abandoning the road-side and climbing the brae, all clad in gala-robes of magenta heather-bloom, we descend its western slope and knock at the door of a modest farm-house. A little shoeless lassie guides us through the cow-yard and across fields to a stone wall. Just beyond are the Stones of Via, the remains of a cromlech. If the afternoon be not already far spent we can devote its remaining hours to inspecting the Weem

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of Skara Brae, a series of cell-like underground chambers, arranged on either side of an irregular passage.

Of burial mounds, over 2000 specimens can be numbered in the Orkneys alone.* They are believed to be both Pictish and Scandinavian in origin.

I have nowhere come into such close touch with the prehistoric past, as in these islands. The very desolation of the environment, the almost entire absence at times of any near objects that suggest the present, leave the mind free from the intrusion of the forms of modern life and permit a retrogression in thought far back into the past. The devout spirit to-day, with the ever changing yet changeless arch of blue and clouds above, and the eternal, yet ever shifting forms and colors of nature in lakes, sea, meadow and mountains environing, can worship, as the devout spirit worshipped unnumbered centuries ago, within the stone circle of Brogar and before the crumbling fragments, remains of a rude altar.

And if a storm, strong, swift, sullen, is moving southward, shrouding the line of the hills along the northern horizon and its shadow, dun and cold, is advancing steadily toward you across the northern loch, while the loch to the south, the moor, the yellow, sparkling sea and the brown hills of Hoy are all glowing with the light, the life and the joy of a clear summer morning, you will turn away from the world of sunlight to the world of shadow and welcome that weird, strong presence, that is moving toward you, mantled with the gloom of the storm.

As the headlands of Shetland invite to communion

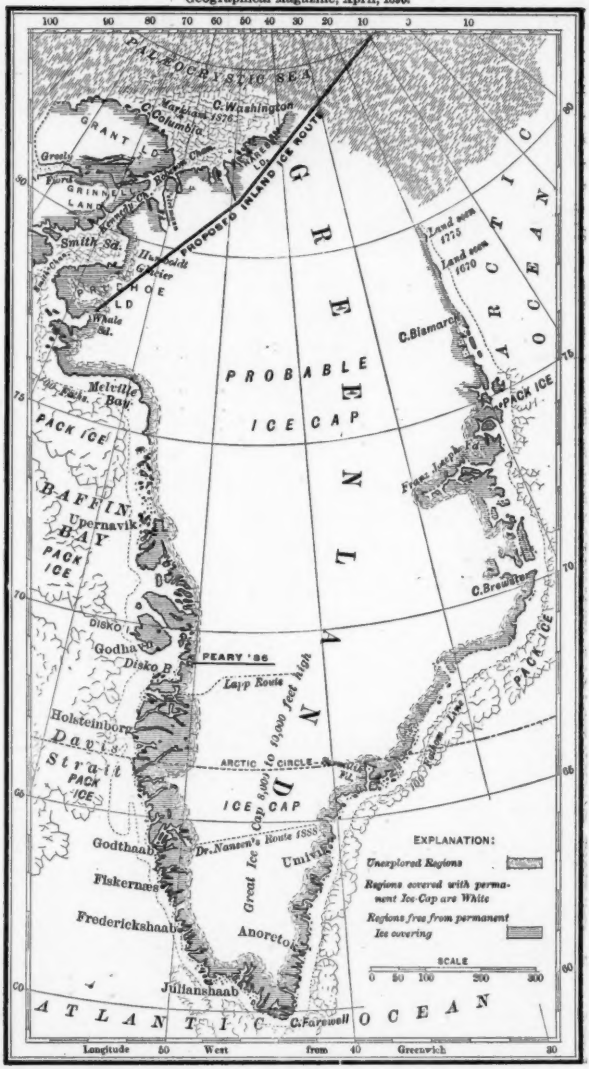
* Tudor, page 16, testimony of Captain Thomas.

with the Norse spirit, so the rude stone circles of the Orkneys to communion with the prehistoric spirit.*

* We have not referred in this paper to the monuments of mediæval architecture existing in these islands, of which the St. Magnus Cathedral at Kirkwall is the most important. Other interesting monuments are the ruins of the earl's palace and of the bishop's palace at Kirkwall, of the ancient church of St. Magnus, Egilsay, Orkneys, and of Earl Patrick's castle at Scalloway, Shetland. For a full description of everything relating to the islands, the reader is referred to Tudor's work previously cited.

SKETCH-MAP OF GREENLAND

Reduced from the original by J. G. BARTHOLOMEW, F. R. S. E., in the Scottish Geographical Magazine, April, 1890.



A PROPOSED EXPLORATION OF NORTHERN GREENLAND.

AN ADDRESS BEFORE THE AMERICAN GEOGRAPHICAL SOCIETY, APRIL 13, 1891,

BY

R. E. PEARY, U. S. N.

MR. PRESIDENT, LADIES AND GENTLEMEN:

The thousand and one little details of preparation for an expedition into a region, where literally nothing can be purchased or found, have so engrossed my attention recently that I have been unable to prepare the finished paper that I should have liked, and that would have been appropriate for this audience.

I hope, however, that I may be able to put before you a correct and realistic picture of the mysterious "Land of Desolation," and to explain to you what I shall attempt to accomplish.

I fancy there is not one in my audience but knows the famous hymn beginning "From Greenland's Icy Mountains," yet I think most of you will be surprised to learn that Greenland has a history, full of events as strange as its own midnight sunshine and far stretching snowfields. Nine hundred years ago, Erik, an Iceland outlaw, discovered the country and named it Greenland, "because," he said, "people would sooner be induced to go thither in case it had a good name." From the colony founded by him, his son Leif and other restless spirits sallied forth to the discovery of the New World.

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Centuries after, from these iceberg-haunted seas, went forth a gleaming pile of walrus tusks, tribute for the Crusades.

Then a hostile fleet descended upon the colonies, and ravished away many of the inhabitants to replace those carried off by the plague or "black death" in Europe. Strange anomaly; Greenland repopulating Europe! Finally, the last of the shipmasters who knew the route to Greenland are said to have been assassinated by German merchants to whom they refused to sell their cargoes, and Greenland, in the fifteenth century, dropped out of the world and was absolutely forgotten, before the voyages of Columbus.

A century or more later, Davis rediscovered the "Land of Desolation," but the colonists had disappeared and to-day, though the Danes occupy nearly all the habitable land in Greenland, only scattered ruins of houses and churches have been found, and these are mute as to the mysterious fate of their former inhabitants.

Geographically and topographically, Greenland has been, since the day its black cliffs loomed through the Arctic fog upon the eyes of Erik, a land of mystery, and a source of constantly increasing interest and speculation.

It has been traced further into the *terra incognita* that encompasses the pole than any other land on the globe, and there are reasons for thinking that its unknown Northern headland may be one abutment of a bridge of islands, over which, through years of Arctic summer day and winter night, a portion of our race slowly migrated from Siberia, *via* the Pole, to this hemisphere.

Its interior is the last retreat of that glacial epoch which for ages submerged Northern Europe, and Northern North America, even as far South as the northern part of this State, in its icy flood. Its shores are famous with the names of Americans, who have dragged its sable headlands and icy bays out of the Arctic fog and night.

From Cape Farewell, its southern extremity, in the same latitude as Christiania, St. Petersburg and Mount St. Elias, to Cape Washington, its northernmost known limit in lat. 83° 38′ N., the distance is fifty miles greater than the extreme width of the United States from the mouth of the Rio Grande to the 49th parallel. It is probable, however, that its northern limit is near to or within the 85th parallel, in which case its extreme length is some 1,739 statute miles, about the same as the air-line distance from Washington to the City of Mexico. From Cape Hatherton, its most westerly, to Cape Bismarck, its most easterly known limit, is 690 miles. Its area is from 740,000 to 750,000 square miles, about the same as that of Mexico, and four times the area of the New England and Middle States. No less than four-fifths of this area, or 600,000 square miles, equivalent to three times the area of France or the German Empire, and thirteen times the area of Pennsylvania, is covered by the inland ice.

The population of the country is about 10,000, of whom between two and three hundred are Europeans, and the Danish Crown supports a fleet of six or eight vessels, and clears some ten thousand dollars annually from the sale of the blubber, eiderdown, ivory and furs obtained in Greenland.

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The coast is bold and mountainous, cut by numerous deep fjords, and protected by an advanced guard of outlying rocky islands. Some of these fjords extend inland a distance of sixty or eighty miles, and many of them are the outlets of great glacier streams from the Inland ice.

There is not a bridge nor a road, a carriage, nor a horse, nor a cow, in the country.

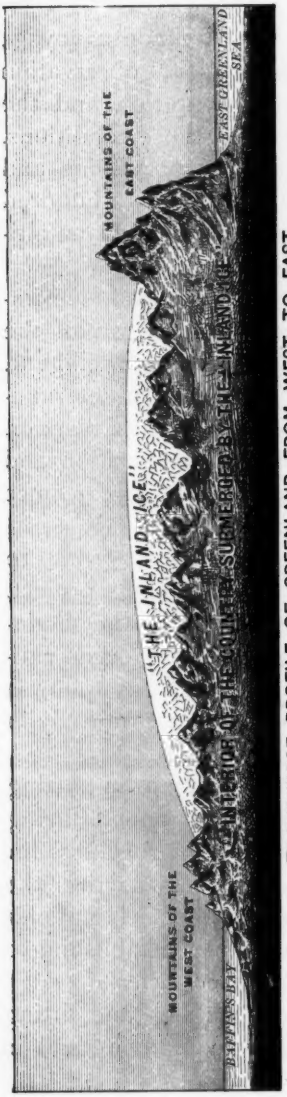
A skin-boat in summer, and a dog-sledge in winter are the sole means of travel. But it is in the character of its interior that Greenland differs from every other known land, and it is in this interior that the chief interest centres.

As far back as 1728 an expedition which attempted to cross from one of the southern settlements on the west coast of Greenland, to the east coast, encountered an impassable ice desert, and during the next one hundred and fifty years it was discovered that throughout the entire known circumference of Greenland there existed, at a distance from the coast varying from ten to eighty miles, an unbroken wall of ice, and enormous glaciers.

As late as 1883, it was believed by some, most prominent among whom was Baron Nordenskiöld, that this icy barrier was comparatively narrow, and that within it lay an ice-free and fertile interior.

His expedition into the interior in 1883 changed his views entirely, and his experiences, together with my own in 1886 farther north, and Dr. Nansen's in 1888 farther south, show conclusively that the entire interior is submerged by ice.

Now picture to yourselves an irregular ribbon of bare


MOUNTAINS OF THE EAST COAST
EAST GREENLAND SEA
"THE INLAND ICE"
INTERIOR OF THE COUNTRY SUBMERGED BY THE INLAND ICE
MOUNTAINS OF THE WEST COAST
BAFFIN'S BAY

TRANSVERSE PROFILE OF GREENLAND FROM WEST TO EAST.

ragged mountains, valleys, and branching fjords, covered with snow in winter but free in summer, and rich with greens, and reds and browns, which warm up wonderfully in the brilliant yellow sunlight of the long Arctic day. Then imagine this ribbon surrounding an interior entirely buried in snow and ice, the accumulated precipitation of centuries, not, however, as the Adirondacks or White Mountains might be in the depth of an exceptionally severe winter, but literally submerged till every topographical feature is completely obliterated.

Greenland is in fact but a Titanic mountain dam holding in check a mighty sea of ice. Where there are breaks in the dam, the ice pours through in a resistless glacier torrent and descends to the sea. Where there are shallow notches in the crest of the dam, the ice flows through and hangs suspended in frozen aerial cataracts.

Four years ago last summer, drawn by the loadstone of

desire to penetrate this frozen sea, I made a voyage to Greenland, to satisfy myself by personal observation as to the conditions of its unknown interior, and the proper travelling equipment to meet those conditions.

With one companion, dragging our provisions and sleeping gear on sledges, I penetrated over a hundred miles into the great glacial desert, and attained an altitude of 7,500 feet above the sea.

I returned from my tramp on the Inland ice impressed with the idea that the imperial highway of the interior offers to a party of two or three intelligent, resolute men, properly equipped, the means of determining, in the quickest, safest and most economical manner, the northern limit of Greenland and the position and contour of its undiscovered coasts. Every year since has but strengthened me in my convictions.

Now in a few weeks I expect to be on my way to prove or disprove my theories. In outline my project, which has met the approval, not only of the distinguished geographers of the Society, but of other eminent geographical and scientific experts, is as follows:

The party, of five or six, to land in June or early in July, at or near the mouth of Whale Sound.

The remainder of the summer to be spent in putting up a house on the north side of Whale Sound, laying in a store of meat, getting everything in readiness for the winter, making a reconnoissance northward over the "Inland ice" to the southern angle of Humboldt Glacier, and, if the season be favorable, establishing a depot of supplies in the vicinity of the glacier.

The winter to be occupied in making and fitting sledges, clothing, and all travelling equipment, and in

snowshoe and "skier" practice, for which the level surface of Inglefield Gulf (head of Whale Sound) is especially adapted.

Early in the spring, four or five of the party to start overland across the "Inland ice" to Humboldt Glacier, with all the sledges and dogs, leaving one man in charge of the house.

If the travelling and the weather be favorable, the sledge party will go on from Humboldt Glacier to the head of Petermann Fjord (90 naut. miles). Here a depot will be established, and two or three of the party, with their dogs and sledges and a full supply of provisions, will proceed; the remaining man or men, with the empty sledges and extra dogs, returning to Whale Sound, where they, with the one left in charge of the house, will utilize their time in hunting for the winter's supply of meat, collecting specimens, making meteorological observations, and surveying.

The sledge party will proceed from the head of Petermann Fjord to the head of Sherard Osborn Fjord (120 naut. miles), establish a depot there, then to the head of Meigs Fjord (110 naut. miles), establish a depot there, thence to the northern terminus of Greenland (100 to 200 miles).

This point reached and determined, the party would retrace its steps to Whale Sound, taking up the various depots, and take the first opportunity to return home.

PERSONNEL OF PARTY.

This to consist of five or six persons, viz.: Chief, Assistant, Doctor, and two or three others; all young, hardy and active.

In Arctic work every increase in the party beyond the number absolutely essential is an element of danger and failure. This essential number (of white men), for a main advance party, may be put at two or three, and for a complete main advance and supporting party at five or six.

The explorations of the Greely Expedition were all made by three-men parties.

Schwatka's great sledge journey was made with a party of four white men.

Payer in his sledge journey in Franz Joseph Land started with a party of seven, but found this number only a hindrance, and, leaving four, pushed ahead with two companions.

Nansen's party numbered six.

My own party only two.

Holm's party to the east coast of Greenland numbered four.

Hall's earlier explorations, and Graah's journey along the east coast of Greenland, are striking examples of the success that may attend the efforts of *one* resolute man in Arctic exploration.

PROVISIONS AND EQUIPMENT.

Provisions and equipment for two years will be selected and designed with the utmost care and judgment that my own experience, combined with several years' careful study of the records of Arctic explorations, will permit.

PRACTICABILITY OF THE PROJECT.

The results of the various attempts to explore inner Greenland, leave little or no room to doubt that the

entire interior is completely submerged beneath the accumulated frozen precipitation of ages, which, surrounded and confined by the Titan dam of the coast mountains, forms an immense congealed reservoir, the like of which exists nowhere else upon the globe.

The area of this reservoir is about thirteen times as great as the State of Pennsylvania, and its surface, rising gradually from the edges, attains in the centre an elevation of 9,000 to 10,000 feet above the sea level.

The experiences of those explorers, who have succeeded in penetrating any distance over this frozen sea, show, that while its borders for a width of from ten to forty miles (depending upon the season, the latitude and the elevation), may be of almost impassable roughness, interrupted by huge crevasses, and traversed by rushing glacier rivers, its central portion is covered by a layer of fine dry snow, gradually increasing in depth toward the centre.

To most, if not all previous explorers, this deep dry snow has been a *bête noire*, but I will ask you to accept my statement, which I make as the result of some experience both in boyhood and in later years, that to a properly equipped expert it is the perfection of roads, and offers fewer uncertainties of travel than any other surface known to me.

To a physically perfect, resolute, hardy man, at home on snowshoes and "skier," and specially equipped, this snow covering of the Inland ice presents a field from which almost every one of the elements of uncertainty, that have hitherto made success in Arctic travelling argely a matter of luck, is eliminated.

To keep this paper within as brief limits as possible,

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I will ask you also to accept my simple statement that, given a choice of latitude, of elevation, or of season, there is no considerable distance along the border of the Inland ice in North Greenland, in which there is not some place, where a party may step from the mountain summits directly upon the dry unbroken snow surface, and advance into the interior, without seeing a crevasse, an ice hummock, or a glacier stream.

The question of practicability then figures down to the average rate of daily advance which may be reasonably counted upon, and the possibility of carrying provisions for the time, which, at such rate of advance, will be consumed in covering the total distance.

From fifteen to twenty miles per day I believe to be a conservative estimate of average daily advance over the "Inland ice."

In 1874 Payer for 27 days averaged 11.85 miles per day, over the ice of the Franz Joseph Fjords.

In 1882 Greely for 12 days averaged 20½ miles per day, in the interior of Grinnell Land.

In 1883 Lockwood for 57 days averaged 18.76 miles per day, along the North Greenland coast.

In 1884 Lockwood for 31 days averaged 14 miles per day, across Grinnell Land. During several marches on a lake, over which the travelling may be considered as almost identical with "Inland ice" travel, he made 21 to 26 miles in 6 to 7½ hours, an average of 3½ miles per hour.

Dr. Rae for 22 days averaged 27.27 miles per day, across the Hudson Bay region.

The average of all these averages is 18.48 miles per day.

So much for speed ; now as to time.

Lockwood's party was out 57 days.

Hayes' party was out 60 days.

The parties of Aldrich and Beaumont were out over 70 days each.

These are the records of travel over rough sea ice, or the broken rocky surface of ice-free Arctic land, and a party on the Inland ice could hardly fail to materially better these results.

Assume the speed, however, to be the same as the above average (18.48 miles per day).

If we suppose the northern terminus of Greenland to be near the intersection of the 85th parallel and the 10th meridian (W. of Greenwich), and I think there is much more probability of its being in a lower rather than a higher latitude, the total distance from the south side of Humboldt Glacier to the terminus, and return, is about 1,064 nautical, or 1,219 statute miles. A simple sum in division gives 66 days as the time required to traverse this distance.

SPECIAL ADVANTAGES.

These are : The possibility of laying a straight course from point to point, with the certainty that no tidal crack or chaos of heaped up ice will compel a long detour, or stop all further advance ; that every foot travelled is a foot advanced, and the comforting assurance that nothing can happen to cut off the retreat.

The even and unvarying character of the surface to be traversed, and the gain in lightness of sledges and equipment, and rapidity of advance, resulting therefrom.

The length of the season (at least six months) during which sledging may be prosecuted.

The facilities that the "Nunataks" or island mountain tops, which in Middle and South Greenland (and also without doubt in North Greenland), project above the "Inland ice" at distances varying from two or three to forty miles from the edge of the ice, offer for forming depots of provisions. Depots placed on these "Nunataks" are safe from the attacks of bears or other animals, and the "Nunatak" itself forms a prominent landmark, by which to recover the depot.

The exceptional value of the elevation of the route in accurately charting the coast and detecting the existence of more northerly land or lands. From the heights of the ice cap, with miles of the coast lying like a map below, as I have seen the entire circuit of Disco Bay, and at another time Noursoak Peninsula, Omenak Fjord, and Svarten Huk Peninsula, the coast can be charted with an accuracy and rapidity unknown to one toiling from headland to headland along the seashore.

The one disadvantage of this route, which, however, it shares with all Arctic routes, lies in the storms, and against the fury of these a pit in the snow affords shelter and is always available.

Once the idea is grasped of exploring Greenland from the *inside*, from the smooth, serene heights of the interior ice, instead of from the outside, through grinding ice fields or along a ragged coast, it will be seen how simple and easy it is.

It is like exploring an atoll around the margin of the placid central lagoon, instead of along the outer shore through reefs and breakers.

RESULTS TO BE ANTICIPATED.

The solution of a geographical problem (viz. : the northern extension of Greenland) second in importance only to the discovery of the North Pole.

The possible discovery of the most practicable route to the Pole.

The certainty of important additions to our knowledge of the geography, geology, glaciation, ethnography, meteorology, and natural history of the Arctic regions.

Let me note the salient points of my project. My base is the one advocated by Kane, Hayes, Hall, the distinguished President of this Society, and almost every American authority on Arctic exploration; a region having a small and kindly native population, with abundance of game, and within easy reach of the whalers which pass Cape York every year, on their way to the fishing grounds in Lancaster Sound and the adjacent waters.

My line of advance is absolutely direct throughout each 100 to 200 mile section. If it were not desirable to touch at the heads of Petermann, Sherard Osborn, and the other principal fjords, which interrupt the Northern Coast, and determine their length and the characteristics of their heads, the line of march might follow very closely the arc of a great circle from the head of Whale Sound to beyond Lockwood's farthest.

The following will, I think, bring home to every one the directness of my proposed route. Lockwood, in attaining his "farthest" from Fort Conger, and return, travelled 1,069¾ (Greely's Report, vol. 1) statute miles. The distance from the head of Whale Sound

via the Inland ice to the "farthest," and return, is 1,028 statute miles. As to the obstacles and difficulties of travelling on the two routes there is no comparison.

The smallness of the party I also consider a vital element of my project. With the small party, the unbroken snow for a road, the never-to-be-foreseen vagaries of Arctic seas, and Polar ice-floes eliminated, and the entire Arctic summer in which to travel, I believe that all contingencies in my plan are as completely within the scope of experience and careful prevision, as those of a winter journey across our own prairies; and I am confident that success is almost certain.

Many have spoken to me of the dangers of the trip, my rashness in undertaking it, and the uncertainty of my return.

As a matter of fact I consider that there is no danger whatever in the project.

There are now in Northern Greenland, under climatic conditions and environment similar to those of my proposed headquarters, Danish officers with their wives and families, living the same home life as the better classes here, with their window gardens, their music, their books, and all the other accessories of culture and refinement.

Were it not that the ice makes the navigation of Melville Bay in some seasons uncertain for a sailing vessel, there would be one or more of these families near the proposed site of my headquarters.

The only element of hardship for my party will be the exposure to cold, and for a healthy, well-clothed, and well-fed man, I consider this as nothing more than a physical annoyance, not a danger.

Risks of the sea are eliminated in my project, savages, wild beasts, poisonous reptiles and vermin there are none; fever and malaria are unknown.

I want you to divest yourselves of the popular conception of the Arctic regions in general and Greenland in particular, as a place where eternal snow, overpowering cold, and Cimmerian darkness hold unbroken sway throughout the year, and where the unavoidable fate of any poor mortal is, sooner or later, to drop into the snow benumbed and starving.

The brilliancy and teeming life of the Arctic summer, during which my work will be done, is equalled nowhere else on the globe, and as for the dangers and hardships of an eighteen months' sojourn, where I propose to go, they are no greater, sentiment and imagination put aside, than in Northern Norway, in Siberia, in the higher Alps, or, to come nearer home, than those experienced every winter by the Dakota and Montana farmers and their families.

R. E. PEARY.

JOURNEYS ON THE INLAND ICE.

The pages that follow, most of them taken, and often in his own words, from Dr. Nansen's "The First Crossing of Greenland," Chapter XVI., are added to give to the readers of Mr. Peary's paper a comprehensive view of what is known concerning the Inland ice of Greenland. The responsibility for this abstract, as well as for the observations and notes which occur in the course of it, is sufficiently indicated by the initials at the close of the paper.

The first suggestion of a journey to the interior of Greenland is found in a letter of instructions written in 1723 by the manager of the Bergen Company to Hans Egede, in these words: "It seems to us quite advisable, if indeed the thing has not been done already, that a party of eight men should be told off to march through the country, which according to the map would appear to be only from eighty to a hundred miles across at its narrowest part, for the purpose of reaching, if it be possible, the east side, where the old colonies have been, and on their way to look out for forests and other things."

Egede thought the scheme was not feasible; but in 1728 positive instructions were sent to Major Claus Enwold Paarss, the first and last titular governor of Greenland, "to spare no labour or pains, and to allow himself to be deterred by no danger or difficulty, but to endeavour by all possible means and by one way or another to cross the country to the aforesaid 'Österbygd' (Eastern Settlement; the old colony) for the purpose of learning whether there still exist descendants of the old Norwegians; what language they speak; whether they are Christians or heathens, as well as what method of government and manner of life prevail among them."

Paarss started on his expedition April 25, 1729, with two officers and five men, and sailed far into Ameralik fiord, where Nansen's overland journey ended in 1888.

The party did not go very far. "After we had marched for two days,"—says Paarss, in his report,—"we came at noon on the third day to theedge of the 'ice mountain'; but when we had ascended this and

advanced upon it for two hours at our great peril, all further progress was denied us by reason of the great chasms which we found thereon. . . . As soon as we saw that no further advance was possible, we set ourselves down upon the ice, with our guns fired a Danish salvo of nine shots, and in a glass of spirits drank the health of our gracious King on a spot on which it had never been drunk before, at the same time paying to the 'ice mountain' an honour to which it had never before attained; and after we had sat and rested ourselves for about one hour we turned back again."

Paarss found great stones lying upon the ice, and conceived that they had been carried there by the violent winds. He compares the sharp-edged ice to "white sugar-candy"; and his party returned to Godthaab on the 7th of May, from "this dangerous and very laborious expedition," not wholly without its convivial moments.

It is stated in a book entitled, *Nachrichten von Island, Grönland and Strasse Davis*, published at Hamburg in 1746, that a ship's captain attempted to penetrate into the interior of Greenland by all manner of expedients, employing "even the long footboards which are used, as is well known, by the Lapps and others for their winter traffic. But he failed to penetrate far, and after losing one of his men, who ventured too far on in front and sank into the depths before the eyes of the party, while they heard his shrieks and lamentations, but could not go to his help, he was obliged to turn back without his follower, and without any hope of ever advancing further." Dr. Nansen adds that this passage is interesting not only because it

contains the first mention of the use of *ski* upon the Inland ice, but also because it records the only known instance of loss of life on the same ground.

In 1751 Lars Dalager, a merchant of Frederikshaab, made an excursion into the interior. He went out at the end of August, to divert himself with his gun, and "resolved to set out on a journey across the 'ice mountain' to 'Österbygd,' to which determination I was led by a new discovery made in the preceding month of July by a Greenlander who had been so high up while out hunting that he could see distinctly, as he said, the old Kablunak mountains on the eastern side.* This moved me, as I have said, with a desire, at least to see the land, like Moses of old, and I took with me the aforesaid man and his daughter, together with two young Greenlanders. We set out upon our journey after having already advanced thus far into a fjord by the southern side of the glacier (the one known in Greenland and Denmark as 'Fredrikshaabs Isblink')."

The party left the fjord September 2, reached the edge of the ice the next day, and the day after, "in the morning," says Dalager, "we committed ourselves to the ice, purposing to reach the first mountain-top, which lies in the middle of the ice-field and which was five miles distant from us. So far the ground was as flat and smooth as the streets of Copenhagen, and all the difference that I could see was that here it was rather more slippery, but on the other hand one had not to wade out to the sides in the slush in order to avoid being overthrown by the posting-horses and carriages."

* *Kablunak*, or more correctly *Kavdlunak*, is the Eskimo name for Europeans or now more especially Danes.

They went on to the uppermost mountain, called Omertlok, across ice so rough and full of cracks that the march of five miles consumed seven hours. From the top of the mountain they had a wide view inland, and saw in the distance above the north-east horizon some peaks, which Dalager took to be mountains on the east coast, but which have since been identified as *nunataks* (islands or peaks) lying some twenty miles from the western edge of the ice. They are now known as *Jensen's Nunataks.*

Standing on this summit, "we began," says Dalager, "to fall into admiration at the great prospect in all directions, and above all at the mighty ice field which stretched away up the country and across to the 'Eastern Settlement,' where the mountains like those on which we stood were covered with snow." The party remained on the peak till seven o'clock in the evening, when Dalager "ended the day with an address to the Greenlanders, which treated of the inhabitants of Österbygd in old times and of their physical as well as spiritual welfare. Meanwhile the sun went down and we descended the mountain some way and then laid ourselves down to rest."

The journey was continued no farther, the leader finding himself "constrained for many reasons to set my face towards home, one being very important, that we were now going no better than barefooted. For, though each of us was provided with two pairs of good boots for the journey, yet they were already quite worn out by reason of the sharpness of the stones and ice. And as the handmaid whom we had in our company had, to our great misfortune, lost her needle, we could get

none of our things mended. For this cause we were much embarrassed, though we consoled each other with laughter as we contemplated the naked toes peeping out from the boots."

They turned homeward on the 6th of September and on the 8th reached the camping place by the fiord.

"I cannot here forbear to mention," says Dalager, "with what unusual appetite I emptied that evening a whole bottle of Portuguese wine, after which I slept on till the following day at noon."

Dalager believed that the crossing of Greenland was impracticable, not on account of the ice, but because provisions could not be carried and, also, because the cold was too great to be borne for many successive nights. "I can say," he declares, "that of all the bitter winter nights on which I have camped on the ground in Greenland, none have so much distressed me by reason of the cold, as these nights early in the month of September."

Dr. Nansen adds his own testimony to the same effect about the cold of September.

In the last century Fabricius, the naturalist who wrote on the glacial phenomena of Greenland, derived many of his facts from personal observation of the Inland ice.

It was not till the middle of the present century that the attention of the scientific world was drawn to the significance of the Inland ice by the writings of Dr. H. Rink.

He pointed out the enormous magnitude and thickness of the great ice-cap and the fact that Greenland is the only country in the northern hemisphere which

supplies the great icebergs of the Arctic and North Atlantic. He has calculated that each of the great fiords must send out into the sea not less than eight or ten million cubic feet of ice every year.

Dr. Rink's studies and explorations showed the necessity of more extensive investigations at the only accessible spot where the glacial forces were now at work on the largest scale, and a new series of attempts to reach the interior of Greenland began about the year 1860, with the Expedition of the *Fox*, under command of Sir Allen Young, to examine into the possibility of carrying a telegraph-cable across Greenland to America.

There seems to have been at one time, according to Dr. Nansen, an idea of landing a sledge expedition, in charge of Dr. John Rae, upon the east coast, with the object of crossing the ice to the west side. Dr. Nansen tells the story in these words :

" The *Fox* reached the southern part of the east coast about the middle of September, and the sledge-party could apparently have been landed here without difficulty. At this point, however, those in charge of the expedition seem to have thought better of the scheme, so the ship went round Cape Farewell to the west coast instead. Here, at the end of October, Dr. Rae made an attempt upon the ice in the neighborhood of the colony of Julianehaab. From the narrative of Lieutenant Zeilau, who accompanied the party for a time, one would gather that the expedition did no more than contemplate the ice from a distance, but from Dr. Rae's own account it appears that he did really set his foot upon the glacier, but was very soon brought up by a ' deep and wide crevasse that effectually stopped fur-

ther progress.' This, I may perhaps be allowed to say, must have been a remarkable crevasse indeed."

Dr. Nansen takes the quotation concerning the crevasse from the *Proceedings of the Royal Geographical Society*, August, 1889, to which he refers in a foot-note. The account in the *Proceedings* shows that even with the best intentions Dr. Nansen cannot always trust his memory.*

Dr. Isaac I. Hayes made an attempt upon the Inland ice from Port Foulke, in Lat. 78°, 18′ N., in 1860.

* Sir Allen Young (who commanded the *Fox* in 1860) said: . . . "On September 12th, after passing through 100 miles of ice, they arrived at the coast of Greenland, about 63° N. The sight of the coast was simply appalling, with precipitous peaks and cliffs, and glaciers running down to the sea. He was about one mile off the land, and could have landed a party; but feeling that he could not keep his ship in her position, he thought it better to report in favor of carrying a cable round the south into one of the western fiords. Afterwards on the western inland ice, he accompanied Dr. Rae for two days, but heavy snow intervened and he had great difficulty in getting back to his ship. That was in the middle of November. He wished to ask Dr. Nansen if he thought it would be possible to land a telegraph cable on the east coast and carry it across to the west coast.

"Dr. Rae begged to express his admiration, and to re-echo the words of previous speakers, at the manner in which Dr. Nansen had carried out the arduous work he had undertaken. . . . . Regarding the *Fox* Telegraph Expedition, of which Sir Allen Young spoke, and of the overland part of the work, of which he (Dr. Rae) had been placed in charge by Col. Schaffner, the crossing of Greenland, although it was talked of, there was not the slightest intention of its being attempted, not the smallest preparation of any kind having been made for such an arduous piece of work; and if there had been any such preparation, the lateness of the season (November) would have been a fatal hindrance. All that was desired or expected to be done was accomplished by getting a few miles inland on the glacier, and by reaching a deep and wide crevasse that effectually stopped further progress; and showing that to bring a telegraph wire across the ice would be very difficult, if not impracticable, and in his (Dr. Rae's) opinion useless."—*Proceedings of the Royal Geographical Society*, 1889, pp. 484–485.

Dr. Rae was followed by Admiral Sir E. Ommanney, and then Dr. Nansen thanked all the speakers for their kind words, and answered the inquiry as to the possibility of laying a cable across the ice; but he asked no question, when question was so easy, about the "remarkable" crevasse, which has left an aching void in his mind.

The party started October 22, marched about sixty miles and returned after six days, having endured great suffering from the cold. The ice was extremely rough and the snow-crust gave way under the feet, but the distances made were, five miles on the second day, thirty on the third, twenty-five on the fourth, and nearly forty on the fifth, on the return. These measurements, Dr. Nansen rightly thinks, can hardly be accepted.

The next attempt was that made by Mr. E. Whymper, in the summer of 1867, from a little fiord named Ilordlek, to the north of Jakobshavn, and nearly in Lat. 69°. Mr. Whymper reached the Inland ice at about twenty miles north of Jakobshavn, and found the surface smooth and hard for six miles and eminently fitted for dog-sledging.

He turned back, therefore, full of hope that he might succeed in walking right across Greenland. However, as at Ilordlek the ice does not come down to the water's edge, Mr. Whymper determined to look for a spot where he could take to the ice at once, and avoid the transport of his baggage over land. He found no suitable place and had to return to the first spot, where one difficulty after another delayed him for nearly a month.

On the 20th of July the expedition was ready to start. There were six in the party. Two days were spent in carrying the baggage from the fiord to the edge of the ice, and three more in waiting for favorable weather.

When Mr. Whymper came to view the surface, which had been so smooth a month before, he found that the snow had melted away and "had left exposed

a veritable ocean of ice, broken up by millions of crevasses of every conceivable form and dimensions." An attempt was made to push over the ice to the eastward, but, after going a distance of two miles with several hours' hard work, two of the sledges were broken and the rest badly shaken, and the party came to a halt. Three men went forward a mile or two to see if the ice improved, but they reported that it was even worse, and Mr. Whymper abandoned his purpose and returned to the fiord.

Three years after Whymper, Baron Nordenskiöld and Prof. Berggren penetrated a considerable distance beyond the outer margin of the Inland ice, and spent several days in succession encamped upon its surface. Accompanied by two Greenlanders, the Swedish explorers, on the 19th of July, 1870, passed the edge of the ice in the northern arm of Aulatsivikfjord, which lies to the south of Egedesminde, or near Lat. 68° 20′ N. Provisions were taken for thirty days, and the whole equipment was to be hauled on a sledge, but the task was too heavy and Nordenskiöld determined, on the second day, to leave the sledge and a portion of the provisions behind. Each man shouldered his load of the remainder, and the party proceeded. July 21, at 1,400 feet above the sea, the Greenlanders refused to go farther, and went home the next day. Nordenskiöld and Berggren continued the journey. On the 22d they were at a point in Lat. 68° 22′ N., and 56 minutes of longitude east of their camp on the fiord, and at an elevation of nearly 2,000 feet.

They spent the night of the 23d in Lat. 68° 22′ and 20 minutes farther to the east than on the previous day,

at an elevation of only 1,900 feet. Scarcity of food made it necessary to return, but to obtain a view over the ice field the travellers mounted a ridge. From this point they saw that the plateau continually rose, unbroken by any range of peaks. Their turning-point was 2,200 feet above the sea, and about 83 minutes of longitude, or 35 miles, to the east of the northern arm of Aulatsivikfjord, which they reached July 25, after seven days spent on the Inland ice.

The surface of the ice was either furrowed by deep, and sometimes broad, crevasses, or consisted of ridges and hollows, the former as much as forty feet in height and with sides sloping at angles of from twenty-five to thirty degrees. There were many rapid streams, that flowed in deep channels in the ice and often could not be crossed. These rivers generally ended in great holes, or "glacier-wells," into the dark-blue depths of which they were precipitated in roaring cascades.

At one spot was found a kind of spring or fountain, or intermittent column of water mixed with air, projected upwards. There were many small lakes and pools, and "when one laid the ear down to the ice one heard from all sides a peculiar subterranean murmur from the streams enclosed below, while now and again a single loud cannon-like report announced the formation of some new crevasse."

The weather was bright throughout the journey and the temperature, a little above the ice, rose in the day to 45° or 46° Fahr., and in the sun to 75° or even 85°. After sunset the pools of water froze, and the nights were cold.

It was on this expedition that Nordenskiöld observed

and described the "glacial dust" or "cryoconite," a fine grey powder which was found strewn on the surface of the ice, as far as the explorers went. Owing to the absorption of heat from the sun this dust had sunk into the ice and had caused the formation of perpendicular cylindrical holes, one or two feet deep and from two lines to two feet in diameter.

These holes lay so thick that there was often no place between them on which to set the foot. At the bottom of the holes, which were always full of water, the dust lay in a deposit some millimetres in thickness. Nordenskiöld considers that this dust is of cosmic origin, and he believes that the earth is constantly receiving a reinforcement of matter in this shape from the surrounding universe. It has been shown, however, that this powder, in its constitution, has a remarkable resemblance to the materials of the coast mountains; and it is a fact that the quantity of the dust decreases the farther one penetrates towards the interior, while on the east coast by Umivik, where bare land almost disappears, Dr. Nansen found scarcely any dust at all upon the ice.

In 1871 an expedition was sent to the interior by the Inspector of North-West Greenland, but it seems to have accomplished nothing.

In 1872 Mr. Whymper explored the district to the north of Disco Bay and by Umanak Fjord. He made no attempt on the Inland ice, but ascended, on the 18th of August, Kelertingouit, a mountain near Umanak. From the summit, 6,800 feet above the sea, he looked over the plateau and saw "a straight, unbroken crest of snow-covered ice, concealing the land so absolutely that not a single crag appeared above its surface." He meas-

ured with a theodolite the angle to the apparent summit of the ridge and found it to be considerably in excess of 10,000 feet.

One of the strongest arguments of those geologists, who still held out against the glacial theory, was that all the glaciers, known and studied in Europe, had too small a rate of progression (two feet in a day) to produce the enormous results attributed to their eroding and quarrying power. Greenland was to furnish an answer to this argument.

In 1875 the Norwegian geologist Amund Helland visited North Greenland, to measure the rate of movement of the glaciers and to see what results they were producing. He examined, during June, July and August, that portion of the coast which lies between Egedesminde, in Lat. 68° 42′ N. and the fiord of Kangerdlugssuak in the Umanak district, near 71° 15′ N., and studied five "ice-fjords" and a number of minor glaciers, as well as Ilordlek Fjord, where the glacier does not reach the sea. He also ascended the Inland ice at about the spot chosen by Whymper.

Helland found that the glacier in Torsukatakfjord had a daily rate of progress of a little more than thirty feet, while the great glacier in the "ice-fjord" of Jakobshavn moved at the rate of sixty-four feet in a day.

It was in 1875 that Dr. Rink suggested the crossing of Greenland by an expedition from the district to the north of Fredrikshaab. He wrote: "I think that it must be done with sledges hauled by men, and that two small ones ought to be constructed in the most careful way and furnished with every necessary. Besides the

scientific conductor of the expedition and his assistant, I should say about four Europeans would make the proper complement."

"This idea," says Dr. Nansen, "agrees, as will have been seen, in several particulars with my scheme, but, curiously enough, I had never come across this passage till I returned from Greenland."

In 1876, the Danish Government instituted a series of scientific investigations in Greenland. The results of these investigations, which are still continued, are recorded in the *Meddelelser om Grönland*, a work issued periodically by the Board of Commissioners, charged with the undertaking.

The first expedition, under the geologists Steenstrup and Kornerup and Lieut. G. Holm, was to examine the edge of the ice-field in the district of Julianehaab. It was proposed to go some little distance in to a group of *nunataks*, known as the Jomfruer and marked on the maps of Greenland, in order to see whether that would make a suitable starting-point for a subsequent expedition on a larger scale. The party was stopped at the outset by the general roughness of the ice and the size of the crevasses,* and nothing was done beyond measuring the movement of the ice in three glaciers, the highest rate found being some twelve feet in the twenty-four hours.

An expedition in 1877 to the northern part of Fredrikshaab was defeated by the unsettled weather.

In 1878, Lieut. Jensen, the geologist Kornerup, an architect named Groth and an Eskimo, made their way,

*Dr. Nansen finds nothing remarkable in these crevasses, though they also were in Julianehaab.

July 3, to the *nunatak* Nasausak, which is 4,700 feet above the sea, and on the south side of the glacier known as Fredrikshaabs Isblink. The condition of the ice being considered unsuitable at this place, an attempt was made from a new starting point, Itivdlek, on the north side of the glacier.

The ice was exceedingly rough and every one in the party, now increased by the addition of four Greenlanders, suffered more or less with snow-blindness.

On the 24th of July they reached the group of *nunataks* which Dalager, in 1751, had taken to be the mountains of the east coast. These *nunataks* were forty-five miles from the starting-point, and about twenty from the nearest point on the margin of the ice-field. On the largest of these peaks, 5,000 feet above the sea, the explorers were detained for a week, by a snow-storm.

Capt. Jensen ascended the peak July 31, and saw the Inland ice rising uninterruptedly towards the east, and ending in a horizon considerably higher than the peak on which he stood. The same day the homeward march was begun, and the camping-place at Itivdlek was reached on the 5th of August. The efforts of the Government have been confined, since 1878, to short journeys to the near-lying *nunataks*, to explorations along the edge of the ice-field and to measurements of the movement of glaciers. Of the results, one of the most noteworthy is the series of observations made by Lieut. C. Ryder, in August, 1886, which established, for the Upernivik glacier in Northern Greenland, a daily advance of no less than one hundred feet.

In 1880 the Swedish geologist Holst ascended the

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Inland ice at several points in South Greenland. He found that Nordenskiöld's "glacial dust" was composed of the same substances as the mountains of the coast.

Three years later Nordenskiöld made his second Greenland journey. He had formed a theory that it was a physical impossibility for a large continent, like Greenland, to be entirely covered with a mantle of ice under the climatic conditions which prevail elsewhere upon the globe to the south of Lat. 80° N.

His argument was that for the formation of an ice-field or glacier a certain amount of snow or rainfall is necessary, and that the amount deposited in the interior of Greenland cannot be sufficient for the purpose.

All the air, he considered, which came from the surrounding seas and ought to bring moisture with it, had first to pass the ranges of high mountains which border the coast.

As the air passed up the sides of these mountains it would be cooled, and as it rose it would become expanded through the diminished atmospheric pressure, and thus it would be compelled to deposit most of its moisture on the coasts.

In so doing it would set free its latent heat and grow warmer, and its temperature would rise still higher as it descended on the far side of the mountains and the atmospheric pressure increased. In this case, it would reach the valleys and depressions of the interior in a dry and warm condition, like the Föhn of Switzerland.

Nordenskiöld's purpose, in this second expedition, was to test his theory by pushing across the interior of Greenland to the east coast. He started on the 4th of July from a spot a little to the south of Disco Bay,

with a party of ten, two of them Lapps, provided with their *ski*. In eighteen days the party advanced seventy-three miles, and reached an elevation of nearly 5,000 feet. Here the snow was so wet that men and sledges sank into it, and Nordenskiöld found himself compelled to stop; but he sent forward the two Lapps, with instructions, in case they came upon bare ground, to collect specimens of all the plants they found there.

Three days later (July 24) the Lapps returned and reported that they had gone about 145 miles into the interior and had reached a height of 5,850 feet, and that the surface was everywhere an unbroken expanse of snow. Dr. Nansen thinks, with reason, that the Lapps overestimated the distance they had travelled.

One incident of their journey tended to confirm Nordenskiöld's belief in the existence of bare land somewhere to the north. Two ravens had come flying from that quarter, and had turned back as soon as they reached the tracks of the Lapps in the snow; and these birds are not in the habit of straying far, in the summer time, from their nesting-places in the coast mountains.

None the less, Nordenskiöld made up his mind to turn back, and reached his encampment on the 3d of August.

The next expedition was Mr. Peary's, in 1886. He had for a companion Mr. Christian Maigaard, and, for the first few days, the help of two Greenlanders, a man and a woman.

The starting-point was Pakilsokfjord, Lat. 69° 30′ N., and the ascent of the ice began June 28.

The provisions, calculated for thirty days, were hauled, with the baggage, on "two nine-foot sledges,

thirteen inches wide, made of hickory, steel and hide, on a modified Hudson Bay pattern, and weighing complete twenty-three pounds each." One pair of *ski* and one pair of Indian snowshoes, each, were taken. There was no tent, but a shelter was made of a tarpaulin and the two sledges. The travelling was done by night and the sleeping by day, and for a time, while the state of the snow permitted, snow huts were built every day.

During the greater part of the journey the temperature was below freezing-point, but on the 9th of July a wind from the south-east raised the mercury to 46° Fahr.

On the 17th Mr. Peary's reckoning of longitude showed that he was about one hundred miles inland from the ice-edge, and at an elevation of 7,525 feet.

A snow storm detained the two explorers till the 19th, when the weather cleared sufficiently to allow of an observation being taken at mid-day.* In the evening they turned back and, with the wind behind them, lashed the two sledges together and rigged up a vessel with alpenstocks for a mast, a tarpaulin for a sail, and a *ski* with an axe attached for a rudder. On this craft they sailed, according to Maigaard's calculations, twenty-seven miles the first night, thirty-two the second, and fifty-four the third. After this they took to hauling, on account of the rough surface. July 24, they reached the camp at the fiord, having spent twenty-three days on the ice.

Dr. Nansen is disposed to doubt Mr. Peary's report. He says: "Unfortunately, Peary's longitude was only

*Mr. Peary says: "Then followed a perfect day (19th) warm, clear, almost calm, enabling me to get a good observation."

based, as it seems, on some observations of altitude taken with the theodolite about noon on July 19. The expression *circum-meridian sights*, which both he and Maigaard use, is not quite clear in itself. These so-called 'simple altitudes' are, besides, notoriously uncertain for longitude reckonings.

"The chronometer, too, had come to a standstill and an ordinary watch, which Peary declares to have been very trustworthy, was used in its place; but, as far as I can see from his account, no observations were taken subsequently by the coast to determine this time-keeper's accuracy. The distance of a hundred miles from the margin of the ice cannot, therefore, be considered as established beyond all doubt. The days' marches, again, which are said by Maigaard to have often been between twelve and eighteen miles, may strike the reader as somewhat long. I know well from my own experience that a great deal of work is necessary to cover so much ground with a heavy sledge in tow, if the gradient be ever so little against one."* He adds, in a footnote:

"It is difficult to say, too, what faith we can place in this elevation of 7,525 feet, as it was only based upon the records of an aneroid barometer. . . . . Nevertheless, Peary's height does not seem at all too much for

*The best answer to this remark concerning the rate of progress is Dr. Nansen's description of the surface travelled by Peary and Maigaard: "The ice these two passed over was, with the exception of the first part, very level throughout, and more so even than that which Nordenskiöld had traversed in 1883. There were not many crevasses, and for the greater part of the way the surface was covered with a layer of dry snow, into which, at the extreme point which they reached, Peary could drive his staff six feet deep. This state of things must have made progression very much easier than usual."—*The First Crossing of Greenland*, Vol. 1, p. 505.

the distance from the coast. We were quite as high as this when we were no more than 110 kilomètres, or 68 miles, from the east coast, and 160 kilomètres, or 111 miles, from the west; and I should be inclined to think that the gradient must be about the same between Lat. 69° and 70° N."*

Dr. Nansen's conclusion is, after all objections, that Peary's expedition is one of the most noteworthy that have been recorded in connection with the Inland ice, and that admiration is due to the two travellers who did so much alone, and with such small resources. Mr. Peary and Mr. Maigaard have shown no disposition to over-

*Mr. Peary describes his instruments and methods as follows:

"This distance is based on an excellent series of twelve circum-meridian sights at this camp, with the theodolite placed within the walls of our hut to protect it from the wind; a series of ten similar sights at the tent; and time as given by one of the best Elgin watches, carried, during the five days intervening between the observations, in a pocket on the inside of the bosom of my flannel shirt. Having carried the watch two or three years, I know its variation in that time could by no possibility exceed thirty seconds either way. For several reasons no other observations are given.

"In the selection of my instrumental outfit, I had chosen a light traveller's theodolite, as being lighter and more generally useful than a sextant and artificial horizon. But under the conditions of continuous wind and deep snow which I encountered, it was impossible to use the theodolite except by setting it in the compacted bottom of a snow-house after we had slept in it, with the wall of the hut to shield the instrument from the wind.

"In scaling the glacier face, my chronometer had had the usefulness shaken out of it, and after this loss I did not feel disposed to add the labor and discomfort of observations of approximate value only, to the constant and imperative demands of the numerous details, attention to which was the price of our advance. My daily advances were only estimated, and therefore I do not present the distances.

"The elevations are those indicated by one of Keuffell & Esser's best $26 pocket aneroids, with attached thermometer and compass. The ascent on the outward trip, as shown by this barometer, was 7,525 ft., the descent on the return (one hundred and thirty-three hours of continuous fine weather), 7,450 ft. Mean, 7,487 ft., 6 in.

"Temperatures were shown by a Signal Service thermometer."—*Journal of the American Geographical Society*, Vol. xix, p. 276.

rate their own performance, and it may be supposed that they will receive, with some measure of calmness, the approbation which Dr. Nansen bestows upon them.

The next expedition to the Inland ice was Dr. Nansen's, in 1888. A Norwegian sealer, the *Jason*, commanded by Moritz Jacobsen, took up the party at Isafjord in Iceland, and set sail on the 4th of June for the east coast of Greenland. There were six in the party; Dr. Nansen, Otto Sverdrup, Oluf Christian Dietrichson, Kristian Kristiansen Trana, and two Lapps, named Samuel Johannesen Balto and Ole Nielsen Ravna. On the 11th of June they sighted the Greenland coast, about sixty miles away. At noon they were in Lat. 65° 18′ N., Long. 34° 10′ W. The coast was lined with ice, drifting with the currents, the floes now opening, now packing close together, and it was not till July 17th that the boats pushed off from the *Jason* in the evening to reach the land across Sermilikfjord. For twelve days they were tossed to and fro and carried along with the drifting ice; and it was not till July 30th that the explorers landed. On the 15th of August, after working up the coast, they started from their camp near Kiatak, for the march over the Inland ice to Christianshaab on the west coast. On the 26th of August they reached the level of the Inland ice at a height of 6,000 feet, after passing through rain and snow storms and fine weather, and crossing a number of crevasses, which lose nothing in the description. The season was so far advanced that Dr. Nansen determined to make Godthaab the objective point, instead of Christianshaab. As the advance continued the level surface rose again and again, but almost insensibly. September 1, the elevation marked by the

aneroid barometers, which Dr. Nansen is inclined to distrust, was 7,930 feet. The greatest height reached was 8,970 feet.

At these elevations, the sun's rays produced a powerful effect. A spirit thermometer marked 85° Fahr. in the sun, while the real temperature, as obtained by a sling thermometer, was little more than 25°; and on the 3d of September the spirit thermometer in the sun at noon showed 88°, while the temperature by the sling thermometer was 12° Fahr. Dr. Nansen put a minimum thermometer under his pillow in the night of Sept. 11, and in the morning the spirit was a good way below the scale, which marked—35° Fahr. The calculations made by Professor Mohn, of Christiania, as to the lowest temperatures experienced by Dr. Nansen's party, are largely hypothetical, none of the instruments carried registering below—35° Fahr.

September 20, the country to the south of Godthaabsfjord was in sight from the tent, but there was work to be done before the coast could be reached. As it was neared the climate improved, and there were signs of game, many kinds of birds and reindeer. September 26, thickets of willow and alder were found, the bushes as high as a man, and the alders still green. The thermometer marked 55° Fahr. in the shade in the day-time, and the nights were as mild as September nights in Norway. There was a warm and dry easterly or south-easterly wind, like the Swiss Föhn.

September 29, the clumsy little boat the wanderers had put together was launched on the fiord, and on the 3d of October Nansen and Sverdrup, the advanced guard of the party arrived at Godthaab.

As far as can be seen from his account, no observations were taken by Dr. Nansen by the coast to determine the accuracy of his instruments.

The ascent of the Inland ice began at Umivik, on the east coast, on the 15th August, so that the crossing was accomplished in fifty days, and the distance travelled to Godthaab was about 350 miles.

The expedition was in every way a memorable one, well conceived and carried through with energy and perseverance.

G. C. H.

DR. JOHN RAE'S ARCTIC EXPLORATIONS.

Editor the BULLETIN. American Geographical Society:

Dear Sir: You may have among your collection of English Admiralty charts one dated 1855, having the south shores of Wollaston and Victoria Lands drawn upon it, and also my discovery of Victoria Strait (in which Franklin's ships got ice-bound and were abandoned by their crews in 1848)—on a searching expedition, employed by H. M. Government—myself and my ten or twelve men being, however, of the Hudson's Bay Co.'s Service. I in 1851 searched closely, surveyed and mapped out about 750 miles of the coast above named, about 140 miles of which between longitude 105° and 110° W. had, however, been roughly traced by a previous expedition. The 600 odd miles of my survey—all new ground—were part of that, for which I was awarded in 1852 the Founder's Gold Medal of the Royal Geographical Society of England, in the Journal of which (1852), vol. 22, will be found the record of the award of the medal, the President Sir R. Murchison's speech when presenting it, and my Report and chart of the survey.

Now comes the strange part of the story. Captain Collinson, R. N., in H. M. S. *Enterprise*, had come through Behring Strait, also in search of Franklin, in 1851, and in 1852–53, by ship or sledge, passed along the same coast that I had surveyed a year before, but did not get back to England until late in 1854.

On the 29th of December of that year, I received a letter from Admiral Beaufort—then about to resign his position as Hydrographer of the Admiralty to Captain Washington, R. N.,—of which the following is an accurate copy:

ADMIRALTY, December 29, 1854.

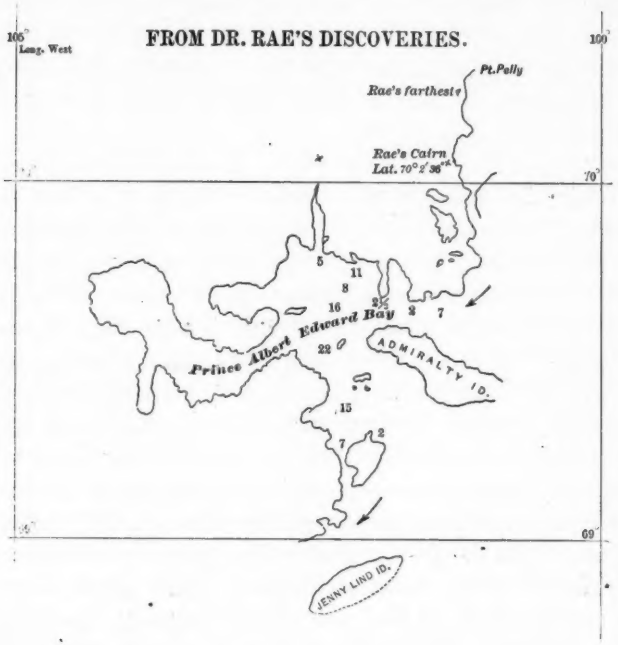
Dear Dr. Rae: I am endeavoring to put into our Arctic chart Captain Collinson's track, and, as far as Cambridge Bay and the Jenny Lind Island (Collinson made Jenny Lind Island part of Victoria Land, although some miles from that shore, with a deep ship channel between. *J. R.*) of your drawing, we get on pretty well by taking his points, and adopting your more minute detail of the shore. But from your Jenny Lind Island up to your Pelly Point, in Latitude 70° 20′ N., I can in no way possible reconcile the apparent configuration of the coast in the two tracings, as you will perceive by the enclosed copies. His Driftwood Point, I suppose to be the eastern end of your Admiralty Island (Yes. *J. R.*), but I know not where to find your broad opening into Albert Edward Bay—can you put me on any scent likely to solve my difficulties?

Yours very truly,

(Signed) F. BEAUFORT."*

I enclose a correct copy of the above named tracings. The Bay referred to, which I surveyed and sounded in my boats, has a coast line of about 200 miles, which Collinson passed and repassed without seeing it! A very short time after this, in January, 1855, a chart of

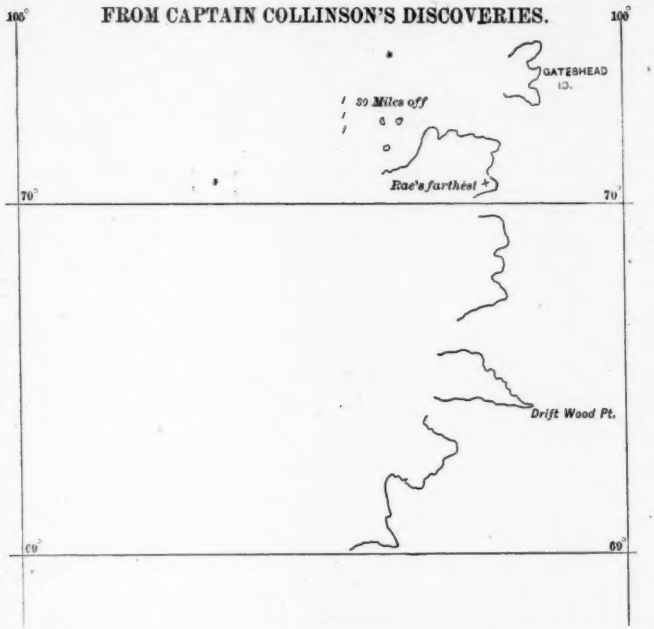
* The only reply given to this note by me, was that Collinson had evidently travelled over the ice far out from the land—although searching for Franklin,—and had not seen the large Bay with 200 miles of Coast. J. RAE.



Note by Dr. Rae.—Two of my men went eight or ten miles beyond this point. The land being a dead flat, I saw them with telescope from an ice hummock at least five or six miles out.—J. R.

this coast was sent me by Captain Washington, then Hydrographer, with the following note inserted:

"From Cape Back round this Peninsula to Gateshead Island (my Point Pelly) the outer line of the coast has been determined by Captain Collinson, and the lakes and inner bays (The bay having a coast line of 200 miles being one of these inner bays. *J. R.*) adapted from Dr. Rae."



Note by Dr. Rae.—My discoveries are cut down to the point where I took my latitude with sextant, 70° 2′ 36″, whereas two of my men, active young fellows, walked at least eight or ten miles farther. The shore being flat as a table, I saw them with my glass five or six miles on their way, I being on an ice-heap fifteen feet high.

Collinson is allowed to put down land seen thirty miles off.—J. R.

For an obvious purpose no dates are given.

When I tell you that nearly the whole of Captain Collinson's chart was exchanged for mine, and errors in one part of even 10 miles of Latitude were corrected, and a chain of islands, 18 miles in extent, of *my survey with* a deep channel inside, made to replace an equal extent of coast of Victoria Land, as Collinson's drawing

had it, you may suppose that the arrangement of actually handing over my prior and correct survey (I say *correct*, otherwise it would not have been adopted by the Hydrographer,) to Captain Collinson was not agreeable to me.

Next morning I went, chart in hand, to the Hydrographic Department of the Admiralty, and asked Captain Washington the meaning of the note given above. I found the Captain in a very high and mighty humor, quite quarter-deck fashion, as when speaking to a subordinate, I suppose, when I remonstrated on the injustice done me, winding up with "*No change or alteration can be made.*" It was now my turn, and I had my remedy handy, and said: "Captain Washington, if you have not that objectionable note removed in a week—I give you a week to think it over—the whole disgraceful proceeding shall be published in the *Times* (of which paper my friend Mr. Delane was then Editor). The Captain looked aghast, and remarked: "Would you *dare* do that to the Admiralty?" It was, perhaps, not good manners, but I fairly laughed in his face, saying at the same time, that I had been four years in the service of the Admiralty, and, setting aside the Hydrographic officials, had always found them civil, courteous and *even* kind, but did not fear them. Repeating my threat, I took my leave. Within four days of the above little conversation a copy of the Chart was sent me, with the aforesaid *Note* covered over with thick cartridge paper, and a letter telling me that the same would be done with all the *copies* on hand, and that the note would be omitted in the next edition.

The next edition soon appeared (that is, in the same

year), and the note above referred to was left out, having had, as far as I knew, a short life of 5 or 6 days. The Hydrographer, feeling probably a little sore and uncomfortable at being frustrated by a mere civilian, inserted another note, as follows:

"The coast from Cape Back to Gateshead Island was discovered by Dease and Simpson (a Hudson's Bay Company's Expedition) in 1839, by Dr. Rae in 1851, and was passed and re-passed in 1851-52-53 by H. M. S. *Enterprise*, Captain Collinson."

Now, every sentence of the above note, with the exception of the five words referring to myself, is untrue, and, unless we can suppose extreme stupidity and ignorance—*wilfully* so.

FALSEHOOD No. 1.—Dease and Simpson, indeed, saw and traced roughly about one hundred and forty miles of this coast; the remaining part (more than 600 miles) *was my work*, and, as I have already said, part of my discoveries, for which was awarded me the Founder's Gold Medal in 1852. Besides this, I corrected Dease and Simpson's survey in some important points, where they had not approached the land near enough with their boats to see clearly the outline of the coast.

FALSEHOOD No. 2.—Neither Captain Collinson, nor his ship the *Enterprise*, was *ever* nearer to any part of the coast named than seventy or eighty miles, in 1851.

FALSEHOOD No. 3.—The *Enterprise* never in 1852–53 passed and repassed from Cape Back to Gateshead Island. The ship got about half way, as far as Cambridge Bay, where she wintered, Captain Collinson going on to Gateshead Island with a sledging party in the spring, 1853.

The above facts seem almost incredible, but the notes —both entered one after the other in the same *chart* in the same *year*—speak for themselves. Probably you have one or other (perhaps both) of these muddled charts in your Hydrographic offices—the first note being still patched over. This false note (the second one) has had something like thirty-six years of an inning—rather an appropriate sporting word for the occasion,—and perhaps you may, in kindness and fairness of spirit, be inclined to aid in restoring to their proper owner the six hundred miles of survey, of which I have for such a very long period been dishonestly dispossessed.

After writing the above, I called at the Admiralty, and saw the present Hydrographer, Captain Wharton, R. N., who was most courteous and painstaking in looking over the documents I had brought with me to explain my rights. He freely acknowledged them, and said he would rectify the injury that had been done, as far as was in his power.

I may further state that it was only about ten days ago, that I found out that the last note mentioned, giving Dease and Simpson credit for the whole survey, was still inscribed on the Admiralty charts, that are on sale at the present time. My belief was, that on its being pointed out that the note was false, as I *did*, the note had been long ago erased or covered up.

Those who care to do so, especially naval officers, might probably be permitted to see Captain Collinson's original tracing at the Admiralty, or a copy of it at Messrs. Stanford's, Cockspur Street. Let them then compare this with the actual outer line of the coast by me, said in the first note to be Captain Collinson's, and

any one, at all conversant with cartography, will at once see what a miserable fiction the whole affair has been.

I beg to subscribe myself

Your obedient servant,

JOHN RAE.

4 Addison Gardens, Kensington,
London, W.
May, 1891.

GEOGRAPHICAL NOTES.

BY

GEO. C. HURLBUT, *Librarian.*

INTERNATIONAL CONGRESS OF AMERICANISTS IN 1892. —The Ninth Meeting of the International Congress of Americanists will be held at the convent of Santa María de la Rábida, in the province of Huelva, Spain, during the week, 1–6 October, 1892, the place having been chosen by the Spanish Government, to which the International Congress, held at Paris in 1890, delegated the responsibility of selection.

Tickets of membership may be had by remitting twelve francs, with the name and address of the sender, to the *Secretario general, Justo Zaragoza, Ministerio de Ultramar, Madrid.*—Each member has the right of admission to the Congress and will receive, free of cost, all its publications.

Manuscripts of authors, who cannot be present at the Congress, must be sent in to the Secretary before August 1, 1892.

The programme (arranged by the Paris Congress) embraces the following divisions and subjects:

HISTORY AND GEOGRAPHY.

1. On the Name "America."

2. Latest Researches on the History and Voyages of Christopher Columbus.

3. Influence of the arrival of the Europeans on the

Organization of the Indian Communities in North America.

4. What modifications did contact with the European produce in the social and political organization of the populations of the Andine region? Density of the population before and after the Spanish Conquest.

5. Taking as terms of comparison the statistics collected by order of the Viceroys, and the latest enumerations made by the Peruvian Government, is it found that the law of gradual diminution of the native population, brought into contact with the whites, applies with equal rigor to Latin and to Anglo-Saxon America?

6. Do the latest discoveries made in the great cemeteries in the caves of the Amazon and the river Tocantins (Marajo islands, etc.), permit us to affirm the existence of a previous race, distinct from the present Indian, with a relatively advanced degree of civilization?

7. Study of cartographic documents, recently brought to light, relating to the discovery of America, and their proper place in the series to which they belong.

ARCHÆOLOGY.

1. Analogies which exist between the pre-Columbian civilizations and those of Asia (China, Japan, Cambodia, Malaysia, Chaldea and Assyria).

2. Statement of the most recent discoveries that have been made under the North American *mounds boulders*,* and the conclusions to be drawn with respect to the civilization of their builders.

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*These two English words, evidently misunderstood and meant for *mound builders*, have somewhat confused the sense of this passage, in the French as well as in the Spanish text.

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3. What were the ancient populations of the Isthmus of Panama, to whom we are to refer the ceramic collections now existing at Yale College and the Smithsonian Institution, etc.?

4. What relation do the various potteries of America bear to each other?

ANTHROPOLOGY AND ETHNOGRAPHY.

1. Nomenclature of the peoples and tribes of America before the Conquest—Pre-Columbian ethnographic maps—Ethnic elements of the southern extremity of the American continent.

2. New discoveries relative to the primitive (*quaternary*, according to the French) American man.

3. Do craniological studies permit us to affirm that the present American races existed in America at the quaternary period (diluvium) and that the conformation of the cranium in those races was the same as that of the Indians now existing?

4. What are the first immigrations of foreign races into America, of which we have knowledge?

5. Penetration of African races into America, and especially in the south.

6. Do the Indians of America in general, and particularly those of the north-western coast, possess distinctive characteristics, which indicate affinity with Asiatic peoples?

7. Eskimos and their half-breeds.

8. Funeral rites in America before and after Columbus.

9. Figure-writing in America and its geographical distribution.

10. Ethnographic distribution and territorial pos-

sessions of the aboriginal nations or tribes of America, in the sixteenth century and at the present time.

LINGUISTICS AND PALÆOGRAPHY.

1. Principal linguistic families of the Amazon and Orinoco basins.

2. Differences between the languages of the coasts and those of the mountains, in Peru. Is there any analogy between the former and the tongues of Central America?

3. Do the Quichúa and the Aimará belong to the same family?

4. Do the tongues spoken on the western coast of America present any grammatical affinity with the Polynesian languages?

5. Is the composition by agglutination and the incorporation of the personal pronoun, or the object, common to the majority of the American languages?

6. Origin of the plural terminations in the Nahuatl and related tongues.

7. Persistence of the character and form of dialects in the languages spoken in America (Spanish, English, French, Portuguese and Dutch) by the descendants of the European colonists, according to the provinces from which these came.

8. Study of languages in process of formation in America.

Real Americanists must regret to see the reappearance, in this programme, of a subject which has tried the patience and the courtesy of so many Congresses. For every one who could appreciate the value of historical evidence, there never was anything to be discovered concerning the name of America.

GUANAHANI.—Mr. Antonio Maria Manrique has written a work* on the First Voyage of Columbus and his landfall, which is identified with Watling Island, in the Bahamas.

This identification, first made by Muñoz, the historian of the New World, is now generally accepted by all those who have studied the question, but there are maps and books of reference, which still uphold the popular belief that Cat Island is the Guanahani, to which Columbus gave the name of San Salvador. In one sense, therefore, it may be said that Mr. Manrique proves what is already known; but his independent conclusion, worked out at a distance from authorities† and under great disadvantages, is in every way creditable to him. He establishes each point by comparing and illustrating the narrative of Columbus with the evidence of the chart.

In the chapter on "The Light Seen the Night Before,"‡ he is so far at one with Navarrete that he shows the impossibility of a light on the low-lying island of Guanahani meeting the eye of Columbus, when the *Santa Maria* was forty-eight miles distant from the shore, but he believes that Columbus did see a light, probably on board the *Pinta*, and naturally referred it to the land, when this was discovered four hours later. The Admiral's conviction on this point was, in his state of mind and under the circumstances, entirely natural;

* Guanahaní. Investigaciones Histórico-Geográficas sobre el Derrotero de Cristóbal Colón por las Bahamas y Costa de Cuba, que comprenden la situación exacta de la primera tierra descubierta del Nuevo Mundo, por Antonio María Manrique. Arrecife (Canarias), 1890.

† He says, for instance, that he has never seen the *Historia* of Muñoz.

‡ La Luz de la Víspera.

and, rightly considered, it leaves no justification for the severe remark made by Cesáreo Fernández Duro: "Nevertheless, it is painful to record it: Viceroy and Admiral, he exacted also for himself the pitiful sum of money, to which the seaman earnestly laid claim as a help for his poverty, declaring that before any other person he had seen a light, the sure sign of land."*

The very smallness of the pension (10,000 maravedis=$14.70) strengthens the argument of Mr. Manrique on the subject: "To affirm that he had seen the light before any other person was equivalent to declaring that he was, from every possible point of view, the discoverer, the revealer of a new world. To renounce the prize was not simply to give up to another a trifling sum of money; it was, in fact, to resign a glory justly deserved . . . It was to leave the door open for any underhand plot that might be contrived on board the *Pinta*, from which vessel the cry of 'Land!' had first been heard, a plot that would have brought with it the diminution of his prestige as a mariner and, above all, as the commander of the expedition.

* Sin embargo, sensible es consignarlo: Virey y Almirante, quiso para si también la pequeñísima suma que reclamaba con encarecimiento el marinero como remedio de su pobreza, afirmando que antes que otro alguno había visto él una luz, indicio seguro de la tierra.

Colón y Pinzón. Informe, etc, por el Capitán de Navío Cesáreo Fernández Duro, p. 305. Madrid, 1883. Memorias de la Real Academia de la Historia, Tomo X.

The sum of money was the pension of 10,000 maravedis promised by the sovereigns to the person who first discovered land, an amount too insignificant, even after making allowance for the greater purchasing power of money at the close of the fifteenth century, to have constituted an object in the eyes of Columbus.

The land was first seen by moonlight, at 2 A. M., by a sailor on board the *Pinta*. His name, according to Oviedo, was Rodrigo de Triana; according to the testimony of three persons who had sailed with him, Rodriguez Bermejo, of Seville. Navarrete and Cesáreo Fernández Duro believe that these two names designate the same individual.

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. . . A man in his position was bound at every hazard to take care that the crew of the *Pinta* should see Martin Alonso, their captain and fellow countryman, in his true light as nothing more than an officer, who had to receive his orders from Columbus." *Guanahaní, p.* 206.

With all his admiration for Columbus, Mr. Manrique cannot be charged with prejudice against Pinzón, or unfairness towards those who seek to find excuses for that captain's disloyalty to his commander.

Whether Columbus first landed on the island of Cuba at Nipe Bay, according to Navarrete, or at Jibara, if we follow Mr. Manrique, is a question that will have to be settled before any steps are taken to erect a memorial statue on the spot in 1892; and the time is short for a decision. It might be better to raise a monument, if monument is needed, on the highest point of Watling Island.

October 12, 1892.—Dr. Edward Everett Hale, on behalf of the American Antiquarian Society, of Worcester, Massachusetts, has made the following suggestion in a letter to the Secretary of the Navy:

"Would it not be possible to detail a vessel, with steam power, which might touch at the point of the first discovery—which Captain Fox has fixed at Attwoods Key—on the morning of the 12th of October, 1892? Then let the officer remain as long as Columbus remained, and let him, from day to day, follow his course, which is given in great detail in the log-book of Columbus, so as to really repeat the voyage from day to day, as Columbus made it. Where Columbus caught a lizard our expedition could catch a lizard; where they

caught a turtle, they should try for a turtle; on the day when he met the Cubans smoking they might open a box of Havanas, and in important things or unimporant things, they should follow the detail which he gives of his great adventure."

The Secretary must answer that it would be possible to detail the vessel, with steam power, to go through this performance; but he may well ask why it should be done. If the expedition is proposed in order to prove that Columbus made a voyage to the West Indies, it is, perhaps, unnecessary; and, in any case, the steam power is both an anachronism and an impertinence.

If there is any virtue in repeating details of the voyage, so far as lizards and turtles and cigars are concerned, every other detail must be observed and respected. There must be three vessels, named the *Santa María*, the *Pinta* and the *Niña*, each with her commander and complement of men, properly named, according to the authentic list published by Cesáreo Fernández Duro in his *Colón y Pinzón;* and they must all speak the Spanish of the year 1492, the Admiral with his Genoese accent and idiom, and every other man with the right flavor of dialect that belongs to him. No one detail of dress, or ideas, or rigging, or armament may be neglected; for men and the doings of men are not less important than turtles and lizards. So far as the published extract from his letter shows, Dr. Hale claims for himself the suggestion of the voyage in 1892. It may be his; but in 1889, not long after the *Real Academia de la Historia* had printed its programme of an International Competition to celebrate the discovery of America, it was announced in the telegraphic

news from Europe that the proposition had been made in Spain to equip and send out three vessels from Palos, in 1892, to sail over the track of Columbus in his first voyage.

Whether the Spanish or the American expedition would result in anything, may be doubted. We know the general course that Columbus steered and we know that he reached the Bahama Islands; but we do not know what allowance to make for the errors due to the imperfection of his instruments, and the problem of his landfall is a problem that cannot be solved. Captain Fox is satisfied that Atwoods Key is the true Guanahani; other authorities, no less competent, prefer Watling Island. Even if this point were decided by general agreement, it would not have been proved, and a new discussion would begin with each successive point; and the literature of mere discussion concerning the discovery of America is already a weariness to the flesh and to the spirit.

Recent Charts of the U. S. Hydrographic Office.

Pilot Charts of the North Atlantic, January-June, 1891.

No. 1102.—East Coast of Newfoundland: Cape Bonavista to Cape St. Mary.

No. 1239.—Gulf of Mexico: Campeche Bank, Obispo Shoals, E. and S. Triangles.

No. 1240.—Gulf of Mexico: Campeche Bank, Alacran Reef.

No. 1241.—Bahamas: Egg Islands to Eleuthera Island.

No. 1242.—Japan: Island of Nippon, Yokohama Bay.

No. 1243.—China Sea: Singapore Strait, Singapore Roads.

No. 1244.—Hawaiian Islands: Harbors of Maui.
No. 1245.—West Indies: Island of Curaçao, Spanish Water, Spanish Haven and Caracas Bay.
No. 1246.—West Coast of Africa: Cape Juby to Cape Cantin, with Madeira and the Canaries.
No. 1247.—North America: United States and Canada, Passamaquoddy Bay and Approaches.
No. 1248.—Marshall Islands: Ebon Atoll, Arno Atoll.
No. 1249.—Chile: Mejillones del Sur Bay, Angamos Point and San Luciano Anchorages.
No. 1250.—Guatemala: Port Livingston, Gulf of Honduras.
No. 1251.—Hawaiian Islands: Harbors of Kauai.
No. 1252.—Hawaiian Islands: Harbors of Oahu.
No. 1253.—South America, West Coast: Harbors, Coast of Chile.
No. 1254.—China Sea: Hongkong Harbor.
No. 1255.—China: Wusung River, Shanghai Harbor.
No. 1256.—China Sea: Formosa, Kelung Harbor.
No. 1257.—Hawaiian Islands: Harbors of Hawaii.
No. 1259.—South America: West Coast, Harbors on the Coast of Chile.
No. 1261.—West Indies: Island of Saint Lucia.
No 1263.—Korea: South Coast, Crichton Group—Paön Do Monocacy Anchorage.
No. 1264.—Hawaiian Islands: Oahu, Port Waianae.

THE FOUNDATION OF NEW YORK.—The *Compte Rendu* of the Paris Société de Géographie, No. 11, for 1891, announces on p. 278 that it has received from Mr. P.-Th. Virlet d'Aoust a note on the history of the foundation of New York City in 1623, by a colony fo

Flemings, Walloons and *Avesnois*, and presumably, therefore, more or less French.

This note is to appear in the *Compte Rendu*, No. 12, and may surprise the persons, who have been led to believe that the city of New York was, in fact, founded by the Dutch in the year 1612, or thereabouts. It is never too late to learn, and Mr. Virlet d'Aoust's Flemings must have been remarkable men. To found a city eleven years after its foundation is a feat that equals, if it does not surpass, the celebrated capture of Holland by the Dutch.

It is just possible. however, that 1623 is a misprint for 1263.

Recession of Niagara Falls.—Mr. John Bogart, State Engineer and Surveyor, in his Report, addressed under date of December 2, 1890, to Hon. Andrew H. Green, President of the Commissioners of the State Reservation at Niagara, presents what he believes to be a substantially correct statement of the mean annual recession of the Falls.

The earliest record available for accurate comparison is that of the survey made in 1842, under the direction of Prof. James Hall, State Geologist.

Comparing this with the survey of 1890, it appears that there has been a yearly recession, at the American Fall, of $7\frac{68}{100}$ inches, and, at the Canadian, or Horse-Shoe Fall, a yearly recession of 2 feet $2\frac{16}{100}$ inches. The American Fall has receded in the 48 years $30\frac{75}{100}$ feet, and the Canadian Fall, in the same time, $104\frac{51}{100}$ feet.

In 1842, the length of the crest line of the American Fall was 1080 feet. It is now 1060 feet.

The crest line of the Canadian Fall was, in 1842, 2260 feet, and in 1890, 3010 feet.

The area of the rock, which has disappeared in the 48 years, is, for the American Fall 32,900 square feet; and for the Canadian, 275,400 square feet.

THE NATIONAL GEOGRAPHIC SOCIETY announces a change in the publication of its organ, the *National Geographic Magazine*, which will hereafter be brought out in the form of a series of brochures, each issued as promptly as possible after reception of the material. These brochures will be arranged for gathering into volumes, each comprising the issue of a calendar year, with title-page, list of contents and index, and an abstract of the Society's proceedings, together with lists of officers and members, and a copy of the by-laws and rules.

The Society was organized in January, 1888, and now has an active membership of about four hundred.

GOLDTHWAITE'S GEOGRAPHICAL MAGAZINE. — This monthly publication, begun with the year 1891, sustains the promise of its first number, and may be considered a permanent addition to the resources available for geographical education. It is well printed and well illustrated and it furnishes, under the skilful management of its editor, Mr. Cyrus C. Adams, accurate and entertaining information.

It was an act of faith in Messrs. Goldthwaite to venture upon such an enterprise, and it is satisfactory to note that, although the magazine has passed into the hands of other publishers, it will continue to bear the name of its founders.

XUM

PROF. HEILPRIN'S MEASUREMENTS OF HEIGHT.—Dr. H. Wichmann writes, in *Petermanns Mitteilungen, 37 Band,* p. 104, that cartographers and authors of geographical text-books will do well, for the present, not to adopt Prof. Angelo Heilprin's altitudes of certain Mexican volcanoes, but to retain the older calculations as more worthy of confidence.

A communication from Prof. Hann informs Dr. Wichmann that Heilprin's results were obtained from a single reading, in each case, of an aneroid barometer, which may, or may not, have been corrected; and this had undergone, on the Peak of Orizaba, an alteration which Heilprin himself estimated at .1 of an inch. His measurements may be about 200 feet out of the way.

It is unaccountable, adds Dr. Wichmann, that Heilprin did not improve the opportunity to have his instruments corrected, before and after each ascent, at the Observatory in Mexico; but it does not appear whether the neglect to do this is matter of record, or a mere surmise on the part of Dr. Wichmann's correspondent.

On the 8th of January, 1890, shortly before Heilprin's visit, Ixtaccihuatl, previously looked upon as unconquered, was ascended by the German envoy in Mexico, Baron v. Zedtwitz, in company with the American Consul; but they found, when they reached the summit, that a Mr. Salis had accomplished the feat a few days before them. Baron v. Zedtwitz calls the ascent of Ixtaccihuatl a "real glacier climb," that of Popocatepetl a "toilsome march in the snow."

THE VOLCANO OF POÁS.—Mr. H. Pittier, who is in charge of the *Instituto Físico-Geográfico Nacional* at

San José, Costa Rica, devoted several days (26–31 August) last year to an examination of the volcano of Poás, which is about 19 miles to the north-west of San José.

Poás belongs to the category of complex volcanoes, formed by successive elevations, each simultaneously producing a new crater. Of the three craters now existing, one, apparently the oldest, is near the top of the mountain, at an elevation of 8,400 feet, and only 250 feet below the very summit.

This crater is now filled with water, and forms a beautiful lake about 1,500 feet in diameter. Many of the streams that supply the lake have a sulphurous character, but the water is pleasant to the taste and its temperature varies between 52° and 55° Fahr. There is almost no change in the level of the lake from one season to another, and its surplus waters pass off through the river Angel, at the extreme north-western point of the basin.

The second crater has been almost completely obliterated by the formation of the third, the actual vent of the mountain.

This crater, which lies between the first and the second and a little to the west, is an extremely deep cavity, with walls everywhere perpendicular, except at two points which allow of a descent to the bottom. The gases, continually escaping from below, have acted on the surface of the rocks that form the wall so that it is not easy to identify them, but Mr. Pittier secured specimens of gypsum, pumice, tufa and volcanic sand. The clefts in the wall of the crater were filled with veins of sulphur, and masses of this substance were seen on

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every side. At the very bottom was a lake, 250 feet in diameter.

Frantzius, in 1861, found the temperature of the water in this lake to be 102° Fahr., and Mr. Pittier records a maximum temperature of 180°. The mean level of the lake was 7,470 feet above the sea. Ravines descend on all sides of the crater with a direction toward the centre. The largest are on the southern side, where the walls are highest, and they are cut in the heaps of *débris* at the foot of the rocks, forming beds for the occasional torrents that come down from above. The results of the active erosion caused by these torrents are heaped up in cones on the edge of the lake, or spread out like little beaches. Thread-like streams of water, clear, but with a taste of sulphur, are found in some of these ravines, and are, probably, the only feeders of the lake.

To the south-west, there is in the wall of the crater a wide opening, the threshold of which is at a height of 360 feet above the water; and, on the east, at about two-thirds of its height, the wall broadens into a terrace in the form of a half-moon.

The warm water of the lake is discolored and dirty-looking, and it is saturated with sulphuric acid, generated, apparently, as Daubrée thinks, by the decomposition of sulphates in the heated waters. There is a continual ebullition of gases, and Mr. Pittier has verified in the steam that rises the presence of sulphurous anhydrid and carbonic acid, the usual gaseous products of volcanoes in process of extinction.

At intervals not yet exactly determined a sudden agitation manifests itself at a point near the northern shore of the lake, and gradually increases until there is thrown

up an immense column of muddy black water, which falls back heavily into the pit. This sudden fall produces a dashing of waves, and the lake seems to be tossed by a furious tempest. The spectacle is made more impressive by the sound of the waves, lapping on the rocks at the edge of the lake, with the repetition of the thousand echoes that take it up. Then the vapors, condensing rapidly, form a dazzling white veil, that hides the dark abyss, and rises in shining columns to a height of many hundred feet. Little by little quiet is restored, the winds dissipate the vapors and the crater resumes its ordinary aspect, until another eruption succeeds. The clouds of vapor caused by these explosions are seen from San José, as well as from many other distant places.

Mr. Pittier's explanation of this phenomenon is that the water and the mud of the lake sink to the volcanic centre, where the temperature is extremely high, and the constantly increasing pressure of the resulting gases brings on the explosion.

In his first exploration, made in July, 1888, Mr. Pittier had observed that the bed of the river Angel was separated by no great distance from the edge of the crater, and it occurred to him that there might be reason to apprehend the irruption of the waters of the upper lake into the crater lake. He was led to make a thorough investigation of this matter by a report that the river was already discharging into the crater, and that there was, morever, direct filtration from the upper into the lower body of water.

Careful measurements, executed with the assistance of Mr. Menardo Reyes, established the fact that there

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was no filtration, and that Mr. Pittier's estimate of about 250 or 300 feet for the distance between the river Angel and the crater was rather below the truth. Adding to this distance the thickness of the terrace with its talus, and the barrier between the river and the terrace, the wall of division between the river and the crater must be at least 800 feet in breadth.

THE EXPLORATION OF THE PILCOMAYO.—According to *Petermanns Mitteilungen*, 37 *Band*, p. 104, the expedition on the Pilcomayo River has had an unfortunate issue. Captain Page, of the Argentine Navy, known for his work on the Bermejo River in 1885, started in April, 1890, in the little steamer *General Paz*, on a voyage up the Pilcomayo in the hope of establishing the long-sought direct communication with Bolivia. The diminishing depth of the river compelled him to abandon the steamer for the steam-launch *Bolivia*, built in Scotland for navigating shallow streams, and in this he ascended as far as the Paliño Swamp, 150 leagues (391 miles) from the mouth of the river. In the numerous canals of the swamp the channel was missed, and the provisions gave out, so that Captain Page had to send some of his men back in a small boat to procure supplies. Before help came, Captain Page died; his companions, his son Nelson and the English zoologist Graham Kerr, continued the voyage.

MR. H. W. SETON-KARR'S MAP OF THE CHILCAT COUNTRY.—A GEOGRAPHICAL NOTE in the BULLETIN for March reproduced some of Dr. Aurel Krause's remarks on the resemblance between his brother's Map of the

Chilcat Country (1883) and the one published by Mr. H. W. Seton-Karr in the *Proceedings* of the Royal Geographical Society for February, 1891. Mr. Seton-Karr makes the following statement, in a letter dated May 1 :

"The basis of the small map, in the February number of the *Proceedings* of the Royal Geographical Society, to illustrate the account I gave of my comparatively insignificant journey in British Columbia and Alaska last summer, was not the chart made by Dr. Krause. This I have never seen, moreover, I do not understand German and have never had the pleasure of reading his account of his journey up the Chilcat Valley and back (made ten years ago), which I am informed is published in the Berlin *Zeitschrift* for 1883, nor did I know until after my return that he had ever been there, nor am I aware of any account of his journey in the English language.

"The only map furnished by me as a copy to the draughtsman of the Society or used by him was the latest and best procurable of that region, and to which I had added my route and corrections, published by the Geological Survey of Canada, and entitled 'Yukon District and northern part of British Columbia, Annual Report, 1887, Part B,' by Geo. M. Dawson, D.S., F. G. S., in the construction of which Dr. Krause's chart of this particular river, which I never pretended to have discovered, as well as the work of many other surveyors, of whose names I am as ignorant as I was of Dr. Krause's, have rightly been incorporated. I obtained the name (Klaheena) of one of the tributary rivers from the Indians, and did not manufacture this name out of Dr. Krause's Tlehini, as the writer insinuates, not having

seen his account, and no name being given on the map above referred to.

"I learned from Dr. Dawson that Krause's map was pretty accurate, but that the Chilcat and other valleys were probably shown too wide, and judging by the slight differences I found between my observations and the details which I assume were taken by Dr. Dawson from Krause, I think I did the latter perfect justice, without prejudice, in calling his map 'fairly accurate.'"

THE PARIS SOCIÉTÉ DE GÉOGRAPHIE.—At the meeting of the Paris Geographical Society, on the 17th of April, the President, M. de Quatrefages, sketched the history of the Society, from its feeble beginning in 1821 to its present eminence as the greater parent of a great progeny.

When established in 1821, the *Société* numbered 217 members. One of these, M. Vivien de Saint-Martin, now an Honorary President of the Society, has survived all his contemporaries.

Like every similar society, that of Paris has had its periods of adversity. The membership declined in 1830, and the Revolution of 1848, when there were only 101 names on the roll, seemed to foretell the end; but no one lost heart, and courage found its reward. A steady upward movement began, with the presidency of M. de Chasseloup, in 1864, and in 1881, when death removed its President, Adm. La Roncière le Noury, the Society counted 2,108 members. Four years later, under the presidency of M. de Lesseps, the membership had increased to 2,504, the highest figure yet attained. The slight falling off within the succeeding five years has no

significance, and even if the Society fails to increase its number to 4,000 members, as M. de Quatrefages thinks it may, it has passed, so far as anything human can pass, beyond the reach of accident.

It must be regretted that one passage of the President's address is strangely unjust to three Societies, which have reason to be proud of their history. M. de Quatrefages says: " . . . . Everywhere, in both worlds, the example set by France was followed. Berlin (1828), London (1830), and St. Petersburg (1845), were the first to imitate us." *Société de Géographie, Compte Rendu, 1891, Nos. 9 et 10, p. 249.*

So far as Berlin and London are concerned, this is correctly stated; but after the London Society come the Frankfurt *Verein für Geographie und Statistik* (founded in 1836), the *Instituto Historico e Geographico do Brazil* (founded at Rio de Janeiro in 1838), and the *Sociedad Mexicana de Geografía* (founded at Mexico in 1839); and then the St. Petersburg Society (1845).

THE WORD "STEPPE."—*La Géographie* (No. 123, 1891), discusses the question whether the word *steppe* should have the masculine or the feminine article in French, and remarks that usage is in favor of the feminine, in spite of Littré, who quotes Lévesque, Chateaubriand, and Victor Hugo. The word is in the plural in all the quotations, and the decision of gender rests with Chateaubriand, who alone gives a qualifying masculine adjective, *verdoyants.*

Between the authority of Littré and the predominant usage *La Géographie* remains in doubt, not being able to appeal to the Russians for the extra-

ordinary reason that "they have no article, and say neither *le* nor *la*."

This denial of the Russian right to grammatical gender for the want of an article is enough to make a despot weep, and it seems fair to ask whether *La Géographie* has ever heard of a tongue, known to some men as Latin. The word *step'* (steppe) is feminine in Russian and in most of the languages which have adopted it.

THE EXPLOSION IN ROME.—Mr. Rodolfo Lanciani, in a letter to the London *Athenæum* of May 23, describes the effect of the great explosion in the powder magazine at Rome on the 23d of April:

"One of the most serious casualties has been in the Church of S. Sabina, on the Aventine, where the doors carved in cedar or cypress wood, a work of the fifth century, unique in its kind, have been wrecked. The panels, representing scenes of the Old and New Testament in a style bearing a strong resemblance to the diptychs of the decadence, are all safe, but the framework has sustained serious injuries. The doors are broken in fourteen pieces.

"One of the frescoes of Bonfigli in the Conservatori Palace has also been injured, a piece three feet square having been detached from the wall. In the Church of the Aracoeli a glass window has been shot against the side wall of the Chapel of S. Bernardino da Siena, scratching slightly one of the admirable frescoes of Pinturicchio.

"In the basilica of S. Paolo fuori le Mura the stained-glass windows with full-length figures of apostles and

saints, have all been blown to atoms. They represent a loss of 6,000 *l.*

The stained-glass windows on the stairs of the Vatican Palace, in the apse of St. Peter's, and in the Church of S. Maria sopra Minerva, have met with the same fate.

These last, at all events, are only pecuniary losses, the windows being of modern and not always successful work. The only good specimens of ancient painted glass in Rome—the windows of Claude and Guillaume de Marseille in the choir of S. Maria del Popolo, executed by order of Julius II., and representing events in the life of the Virgin Mary—have sustained no injury. The prompt and energetic action taken in this unlucky event by our Minister of Public Instruction, Senatore Pasquale Villari, gives us the security that not only the damage will be soon repaired, but that we shall be protected from the repetition of such appalling calamities.

"As students of physics and meteorology seldom have the opportunity of experimenting with 265,000 kilos (584,219 lbs.) of gunpowder, it may interest your readers to know what results have been gathered by men of science from this colossal blast. A kilo of gunpowder is said to develop in exploding 216 litres (228 qts. U. S.) of gas; therefore 57,000,000 litres (60,192,000 qts. U. S.) were developed from the Polveriera di Vigna Pia. The power of this mass of gas was such that it could have raised to the height of 450 mètres (1,476 feet) a weight of 117,000 tons.

"Although the powder magazine was located in a hollow between the hills of Vigna Pia, Monte Verde, and Pozzo Pantaleo, and the main force of the explosions was thus directed upwards, the pressure of the air has been

felt equal everywhere—on the tops of the Gianicolo as well as in the deep recesses of the Tre Fontane—and it has acted with equal energy on flat and vertical surfaces. Gates, secured with heavy bolts and doubled with sheets of brass or iron, have been blown open in the Lateran and at S. Saba; and the same effect has been felt even in shut and covered places. Thus, at S. Paolo fuori le Mura, the pressure of the air penetrating through the gaps of the broken windows was strong enough to break into splinters the heavy glass doors of the four chapels of the transept.

"The action of the blast manifested itself in two ways—by an earthquake and by an air-wave. The vibratory movement of the earth travelled with greater velocity than the air-wave; so much so that the shock was felt in the city and the suburbs several seconds before the report was heard. Flower-pots, *bibelots*, lamps, and bottles were upset in closed rooms protected from any inrush of air.

"The blast set the barometrical column in violent motion, beginning with a pressure wave of 204 kilos (450 lbs.) per square mètre ($1\frac{1}{8}$ square yards) followed by a counter wave of suction. The first was marked by an increase of 14 millimètres in the barometer, the second by a decrease of $14 + 11 = 25$ millimètres. The power of suction of this last wave was such that 90 per cent. of the windows have been blown not inwards, but outwards, the fall of broken glass in the streets wounding some three hundred passers-by. The movement in the barometric column lasted sixty-six seconds. It is believed that one-third only of that prodigious mass of gunpowder had time to ignite; the greater portion was blown

up bodily, its explosion taking place gradually. Granules of powder have been collected as far as Ponte Milvio. I myself found a charred piece of an ammunition box in a field two and a half kilomètres (1½ miles) from the Vigna Pia. The report was heard and registered not only at Subiaco, Viterbo and Anagni, but also at Caserta, Ischia, and Pesaro, at a distance of more than two hundred miles."

The site of the powder magazine was on the right bank of the Tiber, just beyond the wall of Aurelian; about 1,000 feet to the east of the Villa Sciarra, and a mile and a third in a southeasterly direction from St. Peter's.

Exploration of the Black Sea.—The Russian Government carried out, in the summer of 1890, a scientific examination of the Black Sea, with the following results:

The mean depth was 6,004 feet, the minimum (600 feet) being in the north-west, bounded by a line drawn from Varna to Eupatoria, and the maximum (7,366 feet) in the sea between the Crimea and Anatolia. The temperature of the surface water was 72° Fahr. in the middle of the basin, and from 75° to 77° to the west and to the east. At a depth of from 30 to 174 feet, the temperature sank to 55° on the south side, to 53° in the centre, and to 52° in the east, west and north. At 180 feet the temperature is only 45°; below that point it rises and at 6,004 feet it is above 48°. In other seas situated under medium latitudes, the temperature decreases with the depth or remains invariable after reaching a certain point, as in the Mediterranean, which has a temperature of 55°.

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At a depth of 450 feet, in the Black Sea, sulphuretted hydrogen is met with, and this is found in such quantity at 938 feet that animal life ceases. At this depth there were found semifossil shells and a few mollusks. Only one-thousandth part of the water of the Black Sea is received through the Bosporus.

Increasing Shallowness of the Volga.—The *Bulletin* of the Société Royale Belge de Géographie, 1891, No. 1, quotes from the *Novosti* the observations made by Prof. Issaief during a recent trip on the Volga. He found that the Kostroma forests had been replaced, for a length of 100 miles, by a scanty brushwood and that the formerly impenetrable woods of the Unja had disappeared.

This destruction is the work of the boatmen on the rivers, who find the wood ready to hand for fuel, and much cheaper than coal. Their depredations have been carried on with impunity, in the absence of legislation for the protection of the forests, and the result is that the country along the Volga and its affluents has, in many places, been entirely stripped of timber. Where the banks are high and rocky, navigation is still unimpeded; but where the land is low and sandy, the bed of the river is rapidly filling, and unless measures are adopted for replanting the woods, the Volga will cease to be a navigable stream.

A Fresh-Water Lake near the Aral Sea.—M. Ed. Blanc, in a communication to the Paris *Société de Géographie* (*Compte Rendu*, 1891, No. 6), mentions the discovery by Col. Koslofski of a lake, hitherto un-

known, to the south-west of the Aral Sea, where the maps formerly represented the Gulf of Aibugir.

In the Russian expedition against Khiva in 1872–73, one of the *corps d'armée*, marching by the west and south-west of the Sea of Aral, passed directly across the position assigned to this body of water, without finding a trace of it; and thereafter the Gulf of Aibugir disappeared from the maps. The surveys of Col. Koslofski show that the gulf, when it was in existence (as lately as the year 1854) could not have had the outline indicated on Khanikof's map; and it is strange enough that the present lake is filled with fresh water.

This fact disposes of the suggestion sometimes made that, under certain conditions, there may be a temporary communication of the lake with the Aral Sea.

The lake has no outlet, and its continued existence in a region where evaporation is so powerful and so rapid does not seem to be entirely explained by the flow of water, supplied to it by a stream from the north-east, fed by the drainage filtered from marshes formed by the overflow of the Amu-Daria.

The basin of the lake may have had its origin in one of several causes. It may have been a part of the original basin of the Aral, and have been isolated by the progressive aridity so general in this portion of Asia; or it may be the result of a geological change, which has raised or depressed the level of the country. The primitive slope of the ground was uniform towards the north, and the waters must have followed this inclination towards the Aral Sea, carrying with them the salt held in solution.

If then, the southern end of the original gulf, which

forms the present basin of the lake, underwent a geological depression, making it lower than the surrounding region, the overflow of the Oxus in time of freshet, and the drainage of the marshes, would have found their way into it. Another, and perhaps the simplest, theory of the formation of the Aibugir is that which supposes that, during a great freshet, a branch of the Oxus (Amu-Daria) may have poured into the Gulf of Aibugir, driving the salt water before it into the Aral, while the earth and the silt, borne down to the sea by the main branches of the river, heaped themselves into banks to the right and to the left of the mouth, and created a bar across the gulf at a level above that of the water at its ordinary stage. When the inundation subsided, the bar would remain, and the gulf that had been would have been changed into the lake.

THE BENUÉ AND THE KIBBÉ.—*Nature* of May 14 reports Maj. Claude M. Macdonald's account, read to the Royal Geographical Society, of his journey up the Benué and its northern tributary, the Kibbé, in 1889. Maj. Macdonald is the first explorer of the Kibbé and made his start on the 21st August.

It has been believed that a connection existed between Lake Chad (Tchad) and the Benué, by the overflow of the Shari on one side and the Kibbé on the other.

At its mouth the Kibbé is 250 yards wide and from 10 to 12 feet deep, in the summer, the season of high water. For the first five or six miles the country was flat and well wooded, and patches of cultivation were then to be seen. After two hours' steaming Dinghi, a Fulbe village, was passed. The people, who had never before

seen a white man, shouted out friendly salutations. August 22, the *Benué* anchored off a large village on the left bank. The people who came down, most of them women, were of the purest-bred Fulbe, and the best looking Maj. Macdonald had seen in Equatorial Africa, east or west.

Their features approached the European and their expression was gentle and modest, though full of vivacity.

The village, named Pamu, was governed by an Emir, who was under the jurisdiction of the Emir of Vola. Every yard of ground was cultivated, and an active barter was carried on with the greatest good temper on both sides.

Soon after leaving Pamu, the steamer reached a deserted country, fifteen miles in length, the barrier between the Mohammedan and the Pagan tribes. The ground was undulating, with isolated hills, and well wooded. The river, 100 yards wide, was dotted with grassy islands and was shallow in some places. It narrowed the next day, and made a sharp bend to the eastward to grassy mountains, with a higher range left to the north. Cultivated patches could be seen, and the main valley stretched back three or four miles; but there was no village. Soon, however, down the winding path came a line of warriors, 200 in number, some with a cloth around the waist, but more without any clothing.

All were armed with spears, three to a man. The steamer anchored about fifteen yards from the bank, and the warriors took to cover behind the boulders and tufts of grass; and a parley began.

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When assured that the white men were not Mohammedans, the natives, who were the outposts of the Pagan tribes, said they lived in a village named Katsho, back among the hills, and, after some persuasion, two of them boarded the *Benué*. They prostrated themselves on reaching the deck; and when they returned to the land the crowd had increased in number.

"The scenery," says Major Macdonald, "was now very picturesque; to our right, *i. e.*, the south of the river, some few yards from the water's edge, the mountains rose in some places quite abruptly. These mountains were for the most part covered with green wavy grass, very pleasant to the eye. One or two streams trickled down the mountain side, forming now and again picturesque waterfalls. The river had suddenly broadened out to a lake, or more properly speaking, marsh, some three miles long by two wide. The range of grassy mountains I have mentioned ran along the southern shores of the lake and terminated with it. The country on the east and north shores of the lake, as far as the eye could see in the direction of the Tuburi marsh (near the Shari River) was open and gently undulating, while from the western shores of the lake the beautiful range of mountains, with their needle-shaped peaks, stretched back apparently for many miles. In the north-east corner of the lake we saw a very large village some two miles distant; this we afterwards ascertained was Bifaré. The channel of the river evidently followed the base of the southern hills."

The steamer proceeded and came to a large village, in which the mud huts were built in clusters; and there were hamlets on the slopes of the hill above. The chief

of the village said the place was called Kaku, and the name of the big water was Nabaret.

The people of the district have cattle, but no horses; and their food is chiefly dhurra and fish. They hunt the hippopotamus.

Major Macdonald took a guide on board and tried to make for Bifaré, on the north-east shore of the lake, and about two miles from Kaku. After going 100 yards, the water shoaled, and the steamer was put about for an opening in the high dhurra, which grew in "immense quantities." Through this opening the channel was found once more, but only 8 yards wide, and 2½ feet deep, and with a swift current. The boat kept on for about a mile between banks covered with dhurra 8 feet high, but had then to retreat and float backwards for a half-mile, the stream being too narrow to turn in, and not more than 2 feet deep. The farthest point reached was a mile and a half from Kaku and thirty miles from Dawa, in the Tuburi country, the place at which Dr. Vogel stopped in 1854, and the farthest point reached by any European entering Africa from the north.

This expedition seems to have established the fact that there is no connection between the Benué and the Shari.

Eastern Egypt.—The London *Athenæum*, of May 23, has information from Mr. E. A. Floyer, now engaged in the exploration of the country between the Nile and the Red Sea.

Mr. Floyer left Assuán in February, with the intention of marching east to Berenice, passing by the well of Abraka, which was marked on a route survey, of which

he had a copy. After two days spent in ascending a ravine, and three or four more in trying to find his way across a plain of Nubian sandstone, he reached Abraka, on the 19th, in Lat. 23° 29′ 51″ N., and Long. 34° 47′ E.

About 8 miles to the south was a rock fountain at the foot of a cliff 1,200 to 1,500 feet in height, on the north side of the Wádi Háshim. Here was a valley full of flowers. North of Abraka, says Mr. Floyer, "the crystalline rocks intrude through the sandstone and nummulitic plain which is superimposed, and in the south. . . . the crystalline rocks running more easterly break off the edge of the plateau and leave a rugged line of jagged edges, along which are the mines and quarries of the ancients." Some quartz cones were "perfectly symmetrical, 300 ft. high, 120 ft. diameter at top, and descending with almost artificial regularity to the base—solid quartz, tinged a lovely pink with iron oxide."

The temple at Berenice is built of coarse coral rock and the wall surfaces are scaled off.

The character of the surrounding ruins was that of barracks and forwarding stations for the mines in the interior. On the 16th of March, Mr. Floyer wrote from the Wells of Abu Had as follows:

The mountains to the west of Berenice are drained by the Wadi Kharīt, which joins the Wadi Gharāra, which falls into the Nile near Darāwi. The catchment basin of the Gharāra extends north and south from 23° 30′ to 24° 30′, but the great body of water passes north-east by the Wadi Le*h*ma and the Wadi Jemāl. The latter is a fine, well-treed *wádi*, and apparently curves into the mountains from the north-west. Judging from

the driftwood, it carried down during the last rain a body of water half a mile wide, and too deep to be passed by a man on foot.

Mr. Floyer offers, with great diffidence, some arguments antagonistic to the theory of a former pluvial epoch. In some cases the *wádi* bed, from a width of a mile, contracts suddenly to a width of sixty yards, but the sides are not eroded. Further, where a depth of water of three feet instead of two feet would have changed the course, the course has remained unchanged; and, still further, the gneous pebbles are carried by the stream little farther towards the sea than similar pebbles have slid down the talus.

About 20 miles north of Berenice the Wadi Haratreit cuts a path twenty feet deep from the hills to the sea, through vertical schists, granite, schistose with igneous veins and low mounds of recent sandstone. There was a fine grove of Avicennia, some trees measuring four and a half feet round the bole. The coloring of the granites was varied, grey, blue and sage-green, buff and bright green, the last a handsome stone.

The people of the country, the Ababde, were very helpful to Mr. Floyer. He divides them into two classes; the wilder, light-colored men, who rarely quit the mountains, and the darker-skinned men who live in the Nile valley, or near it.

"The former," he says "are much like human gazelles. I met one old man, a veritable Orozembo, with his two children. These were beautiful creatures, coats like satin and large, lustrous, timid, soulless eyes just like those of a gazelle. They are dignified, courteous, and they may know a great deal. But they are

inarticulate, and the traveller passes them by as he does the gazelle.

"The darker villagers are intelligent and docile people, not energetic and much at the mercy of the gombeen man or Government Sheikh, who lives on the river, and is sometimes a descendant of old-time Báshibazuk and Mamluk garrisons of Upper Egypt. . . . They have a name for every plant and tree. . . . Most of their mountains are called after some plant, though I have rarely found the plant on the hill named after it. They have five names for hills. . . . Only 'mountains,' *i. e.*, *jebel*, have *wádis*, and it is for this reason that a description of the country should retain the name *wádi* as distinct from the valley. . . . The Abade—the plural is Ababde— . . . when taken to the top of a high hill will name all the places in view. . . . He knows and rarely mistakes granite, sandstone, mica, quartz, and schist. . . . Moving up north along the grey granite belt, we crossed the Wadi Jemal, and reached the ancient mining town of Sakait. Here we saw at a glance that there was many days' work before we could open our lips—temples cut in the rock with Greek inscriptions, tantalizingly partly legible, mountains of shining talc and chlorite, and veins of soft rock of the texture of asbestos, which last we found, by the way, further south; magazines, mines, long galleries stiflingly hot, and a host of things requiring long and patient examination."

Berenice, founded by Ptolemy Philadelphus, stood on a narrow rim of shore between the mountains and the Red Sea. The "Temple" referred to stood in the middle of the city. It was dedicated to Serapis, and it

bears among the inscriptions on its walls the hieroglyphic names of Tiberius and Trajan. The ruins of this city have been visited and described by Cailliaud, Belzoni, Wilkinson and others; and in 1873 Col. Purdy, of the Egyptian army, made a plan of the port and the ancient city, and afterwards surveyed, with the aid of Col. Colston, the country between Berenice and Berber.

THE CONGO FREE STATE.—Col. Geo. W. Williams has brought out three pamphlets* on the Congo State, dated, respectively, July 16, 1890, July 18, 1890, and October 14, 1890. The first and the third arraign the administration of the Free State for nearly every fault and every weakness with which a government can be charged; and on p. 2. of the "Open Letter," it is declared that "a list of competent and veracious witnesses, documents, letters, official records and data has been faithfully prepared, which will be deposited with her Britannic Majesty's Secretary of State for Foreign Affairs, until such time as an International Commission can be created with power to send for persons and papers, to administer oaths, and attest the truth or falsity of these charges."

The charges are twelve in number: that the government is deficient in moral, military and financial strength;

* I.—An Open Letter to His Serene Majesty Leopold II, King of the Belgians and Sovereign of the Independent State of Congo, by Colonel the Honorable Geo. W. Williams, of the United States of America.

II.—A Report on the Proposed Congo Railway, by Colonel the Honorable Geo. W. Williams, of the United States of America.

III.—A Report upon the Congo State and Country to the President of the Republic of the United States of America, by Colonel the Honorable Geo. W. Williams.

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that the posts established are in charge of Zanzibaris, who abuse their power; that the Government violates the contracts made with its soldiers, mechanics and workmen; that the Courts are abortive, unjust, partial, and delinquent; that the Government is excessively cruel to its prisoners; that women are imported and hired out by the State to the highest bidder; that the State engages in trade, in competition with commercial houses; that the Government permits and itself prosecutes the slave-trade; that the Government wages war upon the natives in order to secure slaves and women; that the Government is engaged in the slave-trade, wholesale and retail; that the Government has made a contract with the Arab governor at Stanley Falls for the establishment of a line of military posts from the Seventh Cataract to Lake Tanganyika, "territory," (says Col. Williams) "to which your Majesty has no more legal claim than I have to be Commander-in-Chief of the Belgian army"; and that the agents of the Government have misrepresented the Congo country and the Congo railway.

There is nothing incredible in these accusations, but Col. Williams cannot look for an expression of opinion concerning them until he has produced his evidence; and he does not strengthen his case by his manifest prejudice against Stanley.

Dwarf Races of Africa.—A correspondent sends to the *Bulletin* of the Société Royale Belge de Géographie, No. 2, 1891, some extracts from a paper by Dr. Oscar Lenz on the African Pygmies.

Dr. Lenz has arrived at the conclusion that the Bush-

men of South Africa are a branch of the Central African dwarfs, and that a distinct, aboriginal race long ago inhabited the vast forests that stretch from the banks of the Congo to the Lake Region. This race was probably persecuted and scattered in various directions by more active and powerful tribes of negroes. "It seems to me," says Dr. Lenz, "that it is now proved that certain tropical regions of the vast black continent are inhabited by a race of men smaller than the negroes; and that these diminutive people belong to a degenerate family, which also presents all the characteristics of a degraded race, scattered far and wide in groups of a few hundred individuals, like the gipsies in Europe, without settled abodes, and wandering through the impenetrable forests between the Congo and the Lakes."

He thinks it is incorrect to denominate these people *dwarfs*, because the word implies a certain deformity of structure, while the African Pygmies are in fact, well proportioned. Dr. Lenz presents the following table of comparative statures:

	Feet.	In.	Feet.	In.
Patagonians	5	10	5	11
Swabians (S. Germans)	5	10½		
Kaffirs	5	10½		
Polynesians	5	10½		
Don Cossacks	5	8		
Englishmen	5	6	5	7
Austrian Germans	5	5	5	7
Negroes	5	5	5	6
Frenchmen (North)	5	5		
Bavarians	5	4½		
Frenchmen (South)	5	4½		
Chinese	5	4½		
Australians	5	3¾		
Amboynese	5	2½		
Timorese	5	2½		

XUM

	Feet.	In.	Feet.	In.
Malays	5	1¾		
Andamanese	5	1½		
Akkas (Schweinfurth)	4	11		
Laplanders	4	6¼	4	11
Anbongos (Du Chaillu)	4	3	4	11
Bushmen	4	3	4	6
Eskimos	4	3		
Pygmies, men (Stanley)	4	3	4	8
Pygmies, women (Stanley)	3	3	4	1

The Bayagas, on the Ogowe River, described by Paul Crampel (*Compte Rendu, Soc. de Géog., Paris, 1890, p. 552*), measured 4 feet 7 inches.

West Central Australia.—A paper in Part I, Vol. VIII, *Transactions* of the Royal Geographical Society of Australasia (Victorian Branch), describes Mr. W. H. Tietkins's explorations in the country to the west and north of Lake Amadeus, in the south-western corner of Alexandra Land. The expedition under the command of Mr. Tietkins was the second sent out by the Central Australian Exploring and Prospecting Association, and started from Alice Springs Telegraph Station, March 14, 1889, with twelve camels, and four months provisions for the party of five.

The course was along the north side of the Macdonnell Ranges for 90 miles to Glen Helen Station. Northward from the Macdonnell Ranges lies a broad plateau known as the Burt plain. It is well grassed and lightly timbered near the Range with *Bloodwood Mulga* and *Grevillea*, and there were also some well-grown orange trees, on which the fruit was parched by the summer heat to the size of a hen's egg. Here also grows the Bean tree or cork-wood (*Erythrina*

Vespertilis,) which attains a diameter of eight or nine inches, with a barrel, (trunk) sometimes of ten feet. The wood is white and very light, (11½ lbs. per cubic foot) and it may be pierced all over with nails without splitting.

The first day's march was to Painta Spring, where the camels were watered. The next water was found on the fifth day, when the beasts were already becoming distressed. From this spring two days' journey brought the party to a break in the range, and the line of march was changed to the south, and the watershed was crossed at eight miles distance. The aspect of the country changed. There was more grass land, and there were indications of a clay subsoil. Crows and kangaroos were seen. The hills were low and stony, and the water channels in the wide valleys trended to the south. Haast's Bluff, known to the natives as Nyurla, was here in sight. It is a range of 2,000 feet in elevation. Glen Helen Station, on the Davenport Creek and about three miles south of Mt. Razorback (1,831 feet high), was reached on the 1st of April. Six miles to the east of Glen Helen is Mt. Sonder, 2,495 feet high, and at its base, where Mr. Tietkins encamped for some days, is a stream, which appears to be one of the sources of the river Finke.

Mr. M'Donald, of Glen Helen, gave the native names of some points, as follows:

Mt. Sonder	*Oorich-ip-ma*	(2d syllable accented.)
Mt. Giles	*Umbat-Thera*	(" ")
Mt. Razorback	*Ooratunda*	(3d " ")
Mt. Zeil	*Wallatrika*	(2d " ")
Redbank Creek	*Oorachilpilla*	(3d " ")

XUM

Mr. Tietkins remarks that *Oora* is the native word for *fire*, but that he saw no traces of volcanic rock, or eruptive force. It does not occur to him that *oora* may mean in these names *red*, the color of fire.

He left his camp April 15th, for the unknown west and arrived in ten days at Glen Edith, where he found but three days' supply of water, and set out, with three fast camels, to the southwest, to look for more. When he encamped for the night, twenty miles away, a rain began that lasted four days and five nights.

Glen Edith was discovered by Giles in 1873, and was visited the next year by a party under Mr. Gosse. Mr. Giles marked a tree *Glen Edith*, and the characters were almost illegible. Mr. Gosse had cut GOS, in letters five inches long, on a white gum, and the growth of wood had almost covered the inscription. This overgrowth was cut away, and the letters appeared.

Glen Edith was left May 10th. Next day three of the camels were found to be suffering from the effects of poison; and camp was pitched on a little stream in the Watson Range. From this point the course was west and north-west, over sand-hills covered with *spinifex*, or sand-grass, the hills here, as elsewhere during the journey, being of sandstone. The most northerly point reached was in the range named by Mr. Tietkins *Kintore*, after the Governor of South Australia. The highest peaks, 1,500 feet above the surrounding country, were named Mt. Leisler and Mt. Strickland; and a cairn was erected on the former. Dry as the country was, Mr. Tietkins sprinkled it freely with names.

From Mt. Leisler he saw to the south-west a lake,

which he called *Macdonald*, and his next move was towards it. The north shore was tunnelled in every direction by small black ants.

The water of the lake was salt, and the growth on its shores was spinifex and a salt bush, and in some places oak trees. It took three days' travel to reach the western end of the lake, in about 128° 15′ E. Long., 23° 30′ S. Lat. A range of hills forty miles further west received the name of Baron Ferdinand von Mueller, and then Mr. Tietkins turned eastward to complete the circuit of the lake, to which he gives an extent of 15 miles from east to west, and 10 or 12 miles from north to south.

From this point he followed a direction to the Davenport Hills and thence towards Lake Amadeus, of which, however, he saw nothing until he had climbed the low hills, to which he has given the name of *Long's Range*. From these hills he saw Lake Amadeus extending indefinitely towards the east. He concludes, without having approached its shore, that the lake is a long, narrow channel without any stream of importance running into it from any direction. His homeward route led past Mt. Olga to Mt. Connor, where he turned to the north and then to the east, through a most pleasing pastoral country, entirely unlike the sandy region previously traversed.

Mr. Tietkins was able to map an area of about 14,000 square miles.

British New Guinea.—In Part II, Vol. VIII, of the *Transactions* of the Royal Geographical Society of Australasia (Victorian Branch), Mr. T. H. Hatton-

Richards, Private Secretary to Sir William MacGregor, describes some of his travels in New Guinea in company with his chief, who is sketched with a few happy strokes: "Sir William MacGregor inspires mixed feelings of gratitude and confidence. To the dark man he is an object of daring courage and firm, but silent will. I fear I have often failed in my admiration of the merciful consideration which he evinced towards the angry native, and the patient firmness with which our expeditions were carried out."

Mr. Hatton-Richards is less than just to himself, for his hearers were all impressed by his noble sentiments, and his praise of Sir William.

The travels began in September, 1889, at Cloudy Bay, where the natives looked on the white men with suspicion and, when they had gathered their forces, made an attack "with wonderful skill." The fire-arms put them to flight, with a loss of ten men, killed and wounded.

The expedition was weakened by fever, Sir William MacGregor alone, of 25 men, successfully defying it, and Mr. Hatton-Richards condemns the Cloudy Bay district as unfit for European settlement.

A more important exploration was made in November, 1889—March, 1890, in the Western Division of the Colony. The ascent of the Fly River was part of the plan, and on the 21st November the *Merrie England*, which conveyed the party, anchored at the mouth of the river, near Kiwai Island, where some days were spent. Kiwai is 36 miles long, 2½ miles wide, and only about four feet above high-water. It has a population of about five thousand. Tree Island, marked on the charts to the south-east of Kiwai, is not to be found.

The *Merrie England* drew 14 feet and the channel became too shallow, after she had ascended the river for 51 miles; so that the voyage was continued in the launch *Ruby*, 550 miles farther. Descending the river to the sea, the party coasted to the south-west, visiting the islands of Saibai and Dauan, where the people live in terror of a piratical tribe, the Tugere, who come from the west. Beyond the Mai Kussa River these people were met with, powerful men, and by far the finest race, Mr. Hatton-Richards says, that he has seen in New Guinea. Their only weapons were bows and arrows, and their canoes were clumsy and had no outriggers. The poles, with which the canoes were propelled, were made of the pedestal of the Sago palm leaf.

An observation showed that the explorers were in Dutch Territory, and they accordingly took their leave of the Tugere. On the return voyage a new river was discovered, in Lat. 9° 10′ S., and Long. 141° 25′ E. At the entrance the river was 200 yards wide and from four to five fathoms deep.

It was ascended for 120 miles, at which point it had narrowed to 15 yards and was obstructed by snags, but the depth of water was three fathoms. The course was very winding and the low banks were overgrown, principally with mangroves; and alligators abounded.

This river, which has since been named by Sir William MacGregor the "Morehead," is the only stream within British territory to the west of the Fly, where fresh water can be obtained, near the coast.

Mr. Hatton-Richards makes some just remarks in conclusion on the right of the natives in New Guinea to

fair and honorable treatment at the hands of the white man, duly provided, no doubt, with fire-arms.

THE TANNA VOLCANO IN THE NEW HEBRIDES.—In an address before the Victorian Branch of the Royal Geographical Society of Australasia, in November last, Mr. J. W. Lindt described his visit to the New Hebrides in July, 1890. On the way he touched at Noumea, in New Caledonia, which reminded him of the Southern Italian cities, with houses embowered in orange groves; and the natural beauty of the harbor and surrounding country seemed to him second only to that of Sydney. There was but little cultivation around the town, and the farms were more neglected than those of France.

When he arrived at Tanna the volcano was in eruption, with heavy explosions every few minutes, and roars to which the discharge of great guns bore no comparison. Masses of scoriæ were thrown up, and even in daylight the dense, black vapor that followed each outbreak reflected the fire raging in the mountain. The savages came down to the beach to meet Mr. Lindt's party. They are described as the ugliest crowd ever seen, the expression of their faces rendered ferocious with streaks of red and black paint, their manner bold and inquisitive, and their dress disgusting. Their hair was arranged in hundreds of small tufts, six or eight inches long and wound about with thread to within an inch from the tip, which formed a brush. Four of these men were engaged as carriers, and a start was made for the mountain. The road led into a thicket of cotton-wood and then for a mile through a forest, where Mr. Lindt saw for the first time the New Hebrides

banyan tree, with its enormous trunk and masses of aerial roots. All kinds of ferns and orchids thrive on the bark and among the limbs of this banyan, and it is the home of the pigeon and the Siviri or New Hebrides parrot, and the only tree-snake found in the islands lives in its twisted roots.

Beyond the forest was a stretch of sand, and here a shallow lake reflected the cone of the mountain above it. Though the volcano is but 1,150 feet in height, the ascent was difficult, the incline being nowhere less than 40 degrees, and often much more, and the slope covered with scoriæ and sharp-edged masses of obsidian. The vapors that rose with the unceasing explosions had the smell of steam from freshly slaked lime. Arrived at the edge, says Mr. Lindt, "We all gazed awe-struck at the fiery cauldron below. As near as we could judge, the circumference of the crater edge measured from between two and a half to three miles, but there was what might be termed a saddle, which divided the cauldron into two *unequal halves*." A shameful abuse of power, even for a volcano; but Mr. Lindt goes on: "The larger and more active half was right beneath us, and the smaller basin formed the eastern boundary. On our right, more than 300 feet sheer below us, was a lake of liquid fire, frothing and seething. Every few minutes before an eruption took place the surface of this lake would smoothen like a mirror. Then by degrees the whole face of it would assume a spherical shape, until the pent-up gases below burst the gigantic bubble with irresistible force."

Grouped around the lake were five funnel-shaped pits, varying between 40 and 120 feet in diameter. From the

smaller ones red-hot lava rose unceasingly in jets and columns ; the larger threw out tremendous discharges of lava and scoriæ to a height of 800 or 1,000 feet.

Mr. Lindt's measurement of the volcano—1,150 feet—was accepted and confirmed by Captain Davies, of H. M. S. *Royalist ;* and the height of 600 feet, set down on the chart, appears to be an error.

Swedish-Australasian Antarctic Exploration.—Baron Oscar Dickson's offer to defray half the cost of an expedition to the South Polar region under the command of Nordenskiöld, if Australia raised the other half—£5,000—was heartily accepted by the Australasian Scientific Societies last autumn.

It is more easy to begin than to finish such explorations, but there is little doubt that the year 1892 will add memorable contributions to the knowledge of the polar regions, Northern as well as Southern ; and the Australians must look upon this first enterprise as the assertion of their duty and their claim to explore the Antarctic seas as their own peculiar province.

Ten Years in Equatoria and the Return with Emin Pâsha, by Major Gaetano Casati.

Translated from the original Italian Manuscript by the Hon. Mrs. J. Randolph Clay, assisted by Mr. I. Walter Savage Landor. With upwards of One Hundred and Fifty Illustrations, Colored Plates, and Four Maps.

2 vols. 8vo. *London and New York*, 1891.

The preface, which is written by Capt. Manfredo Camperio, gives two reasons for the tardy appearance

of this work; the first, that the author's early papers were stolen by King Chua, and the notes they contained had to be written from memory. Brief as it is, Capt. Camperio's preface might be cut down. The praise of Maj. Casati's modesty is out of place in the introduction to his own book, and one sentence* in the work itself could not well be surpassed for boldness by any person of a retiring nature.

The explorer appears to be, none the less, a conscientious and truthful writer, and this integrity of character gives value to the record of his African experience, though the narrative is strangely deficient in charm, even for those who have not lost their interest in the Dark Continent. The book is ill-arranged, and the story rambles back and forth in a confusing manner.

The loss of the notes accounts for much of this confusion, but more is due to the want of a sense of proportion, and Casati is less than just to his own achievements as an explorer.

He deserves also very great credit for his entire freedom from jealousy, his generosity and unselfishness, and his fairness to every man, friend or foe.

In his account of the Return, there is not a trace of exaggeration. Stanley and Emin, the principal figures, are drawn, so to speak, in outline and without attempt at relief or shadow. The rescue and the rebellion are not much more intelligible than they were before Casati wrote, but he has told all he knew, and probably

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*"It was a Calvary, but I did not hesitate to ascend it."—*Ten Years in Equatoria, vol. 1, p. 335.*

A similar expression is found in vol. 2, p. 105.

all that ever will be known, about the fall of Emin's government.

The illustrations are like the epigrams of Martial—some good, some not so good, and more of them bad; and the work has suffered in every way by the effort to meet a supposed demand for two volumes.

Longmans' New Atlas, Political and Physical, for the use of Schools and Private Persons. Consisting of 40 Quarto and 16 Octavo Maps and Diagrams, besides Insets and 16 Quarto Plates of Views, etc. Engraved and Lithographed by Edward Stanford. Edited by Geo. G. Chisholm, M. A., B. Sc., Fellow of the Royal Geographical and Statistical Societies.

4to. *London and New York, 1889.*

This Atlas deserves the praise bestowed upon it when it first appeared as "very superior to any of its class yet published in this country" (England); and the comparison may be extended to include the United States.

The physical maps (those confined, that is, to presentation of the physical features alone) are particularly good and clear, with very little of the crowding, hardly to be avoided in the treatment of some subjects, such as the oceanic currents and mountain systems, where these are complicated.

The British Islands naturally receive a great deal of attention, but not more than is demanded in a school Atlas; and the physical maps of England and Wales and Scotland are especially to be commended.

In all the maps the 100 fathom line on the coasts is marked by an uncolored space, and this device, if not entirely pleasing at first, has very decided advantages.

The plates, which present types of the races, characteristic scenes in nature and social life, products of the vegetable kingdom, etc., may have their use, but they seem to be out of place.

OBITUARY.

ANTONIO F. F. DA SILVA PORTO.—The *Gazette du Portugal*, of April 16, from which is taken the portrait here reproduced, describes at length the military and other ceremonies which attended the reception and transfer of Silva Porto's body from the African steamer at Lisbon, to the railway, and the burial at Oporto.

The manner of the explorer's death stirred the national feeling.

It is told that he brooded over the humiliation of his native land by Great Britain, and put an end to his life in a moment of despair.

Silva Porto's name has been familiar for many years to the readers of books of African travel. He was born in 1817 at Oporto, and grew up, almost without education, to the age of twelve years, when he went to seek his fortune in Brazil. After six or eight years' struggle in that country, he passed into Africa and found his way to the District of Bihé, then governed by Maj. Coimbra.

In the absence of the governor Silva Porto administered the district for a year with great energy and integrity, and it was after his representations that the military occupation was decided upon, in 1850. He crossed the continent from Benguela to the mouth of the Rovuma River and back, in the years 1853–56, and visited in his trading expeditions, and explored, a great part of South Central Africa.

The African life seems to have fascinated him, as it did Livingstone; and he cast in his lot with the people, fixing himself at Belmonte in Bihé, where he built his home, and maintained, at his own expense, a schoolhouse.

His open and manly character and his fair dealing conciliated the regard of the natives, and added to the prestige of the Portuguese name. In 1889, by an unhappy accident, his house was burned to the ground, and he was reduced to poverty. The Lisbon Geographical Society undertook measures for his relief, and appealed to the government in his behalf; but his unexpected death put an end to these efforts.

CHARLES A. JOY,

BORN, OCTOBER 8, 1823

DIED, MAY 29, 1891.

Prof. Charles A. Joy, a chemist and scientist of reputation, was born at Ludlowville, Tompkins County, New York. He studied at Union College, and at the Harvard Law School, and afterwards at Göttingen and in Paris.

He occupied the Chair of Chemistry, first at Union

College, and afterwards, for twenty years, at Columbia, withdrawing in 1877, on account of failing health.

He was an officer of the American Geographical Society for about three years, having been elected a member of the Council at the annual meeting held January 19, 1875, and twice elected Foreign Corresponding Secretary; the first time at a special meeting of the Council, held February 12, 1876, to fill the vacancy caused by the death of Dr. E. R. Straznicky, and again at the annual election held January 16, 1877.

TITLES OF PAPERS IN GEOGRAPHICAL JOURNALS.

AMSTERDAM.—*Tijdschrift van het Kon. Nederlandsch Aardrijkskundig Genootschap.*

Public Works in 1889—Differences of Level from a Normal Zero Point—The Assistant-Residence at Gorontalo (Celebes)—Time Reckoning in the Philippines—Late Publications on General Geography—Our Library—Geographical Works and Maps brought out in the Netherlands in 1890—Communication concerning the Scientific Exploration of the Kei islands (Malay Archipelago)—The Geographical Congress at Berne—An Observation repeatedly made in a little Excursion through North Overyssel—The Geology of Celebes—Report of a Voyage in the East India Archipelago in 1888–1889, under instruction of the Netherlands Geographical Society.

BERLIN.—*Gesellschaft für Erdkunde, Verhandlungen.*

Periodical Changes of Position in the Earth's Axis (Prof. W. Foerster)—A Second Visit to the

Veddas of Ceylon (Dr. P. Sarasin)—Grombtchefsky's Expedition to Central Asia in 1889–1890 (Conradt)—On the Mechanical Effects caused by Water Ice (as distinguished from Snow Ice), by Dr. E. Goebeler.

Zeitschrift.

The Punjab (Dr. E. Jung)—The Kinkoni Region in Western Madagascar (Dr. A. Voeltzkow).

EDINBURGH.—*The Scottish Geographical Magazine.*

From the Mouth of the Tana to the Source-region of the Nile (Dr. Carl Peters)—The Mapping of the World, Part III.: Asia (J. G. Bartholomew, F.R.S.E.)—The Pilcomayo Expedition—Southern Africa, Past and Present (Rev. James Stewart, M.D.)—On the Comparative Value of African Lands (A. Silva White, F.R.S.E.)—Explorations in British East Africa—Britannic Confederation, 1: A Survey of Existing Conditions (Sir John Colomb, K.C.M.G., M.P.—Methods and Processes of the Ordnance Survey (Col. Sir Charles Wilson, K.C.B., etc., Director-General of the Ordnance Survey of the United Kingdom)—Statical Oceanography, A Review (Hugh Robert Mill, D. Sc.,etc.)

GOTHA.—*Petermanns Mitteilungen.*

Maj. v. Wissmann's Second Journey across Africa, 1886 and 1887 (Dr. B. Hassenstein)—The Kapaonik Range in Servia (Dr. W. Götz)—Danish Explorations in Greenland in 1889 and 1890 (H. Rink)—The Distribution and Extension of the Races in Brazil according to our present Information (Dr. P. Ehrenreich)—De-

velopment of the Watersheds in the Region of the Julian Alps (Dr. O. Gumprecht)—The Former Lalathal Glacier in the Rodna Mountain (Dr. F. W. Paul Lehmann).

LISBON.—*Boletim da Sociedade de Geographia.*

Maritime Achievements of the Portuguese in the XVI and XVII Centuries (Sousa Viterbo)—The Golden Fields : Portuguese Africa (A. P. Paiva e Pona)—Expedition to the Muatayamvo : Diary of J. Rodrigues Graça, 1843-1847.

LONDON.—*Proceedings of the Royal Geographical Society.*

The Meteorological Results of the *Challenger* Exposition in Relation to Physical Geography (Alexander Buchan)—Notes on a Botanical Trip in Madagascar (G. F. Scott Elliott)—Some Further Notes on North Morocco (Walter B. Harris)—Summary of Recent Pendulum Observations in Russia (E. Delmar Morgan)—Messrs. Jackson and Gedge's Journey to Uganda viâ Masai-Land (E. G. Ravenstein)—Expedition of the Brothers Grijimailo to the Tian Shan Oases and Lob-Nor. Translated, with Notes and Introductory Remarks, by E. Delmar Morgan—From Hai-Phong in Tong-King to Canton, Overland (A. R. Agassiz)—Journey along the Southern Frontier of Nyassa-Land (John Buchanan)—The Sundarban : Its Physical Features and Ruins (John Rudd Rainey)—Note on the Kur River in Fârs, etc. (A. Houtum-Schindler)—Manipur.

MADRID—*Boletín de la Sociedad Geográfica.*

Spanish Guinea—Spain in Africa—Internal Navi-

XUM

gation in Spain (D. Andrés de Llauradó) —The Island of Fernando Po (D. German Garibaldi)—Summary Account of the Travels and Explorations performed by Spaniards during the present century, presented to the IV International Geographical Congress, held in Paris, August, 1890, by D. Francisco Coello—The Roman Roads and the Routes of Pilgrimage in Spain: An Extemporaneous Sketch laid before the IV International Geographical Congress in Paris by D. Francisco Coello, President of the Madrid Geographical Society —Authentic Notices of the Famous River Marañon (D. Marcos Jiménez de la Espada).

PARIS—*Société de Géographie, Compte Rendu.*

The Configuration of the Aral Sea and the Formation of the Fresh-Water Lake of Aibugir, lately surveyed—M. Raoul Humann in the region of the Donaï (Cochin-China)—The Pacific Slope of Costa Rica — French Geodesy — Annamite Tea and Its Culture —Rousson and Willems in Tierra del Fuego —The Kola Peninsula (Lapland)—Ryder's Greenland Expedition — The Geographical Congress at Berne—The Causse de Gramat and the Hidden River in the Abyss of Padirac — Reception of Messrs. Catat, Maistre and Foucart, Explorers of Madagascar—M. Gallois and his volume on *The German Geographers of the Renaissance*—The Veddas—Capt. Monteil in the Niger Basin—M. E. Blanc in Central Asia—M. and Mme.

Rogozinski in Western Africa—M. J. Martin in Asia—South Africa and M. Foa's proposed Expedition—Meeting of the *Société*, April 17—The Winter of 1890–91 in Central Asia and Siberia—The Transcaspian Railway—M. Roux in Kashmir—M. de la Martinière in Morocco—Uganda — Madagascar — The independent Bataks in Sumatra—M. Boutroue's Archæological Mission to Portugal—A Map of America, of 1669—The French Sudan.

ROME.—*Società Geografica Italiana, Bollettino.*

The Traveller Enegildo Frediani (Dr. A. Wolynski)—Colonies and States of South Africa (G. D. Cocorda)—Lake Toba and the Batak Country (Elio Modigliani)—The Badoeï, in Java (Prof. E. Teza)—Dr. A. H. Post on the Development of the Family (Dr. G. A. Colini)—From Obbia to Allula: East and North-east Coast of Somaliland (L. Bricchetti-Robecchi)—The Cartographical Projections of Albiruni (M. Fiorini).

VIENNA.—*Mittheilungen der Kais. Königl. Geographischen Gesellschaft.*

The Ninth Congress of German Geographers—Journey through Montenegro (Dr. O. Baumann)—Rainfall of Croatia (A. Franovic)—A Waterway in South America (Lieut. W. Kreuth)—Old Manuscript Charts in the Imp.-Royal Familien-Fideicommiss-Bibliothek in Vienna (Dr. A. Karpf)—Volcanoes in North-eastern Iceland (Th. Thoroddsen)—Annual Meeting of the Society.

THE PARTY AND THE OUTFIT FOR THE GREENLAND JOURNEY.

Mr. Peary's expedition left New York on the 6th of June; and the following letter, which appeared in the *Sun* of June 7, is reprinted as a record of interest to the Society, no less than to the friends whose good wishes go with the intrepid explorer and his companions:

"It was the writer's desire that his simple and unpretentious project for the determination of the northern terminus of Greenland should be allowed to materialize, and the party to start quietly and without notice beyond the circle of those immediately interested. After the return of the party, if successful, would have seemed an appropriate time for general notice. The publicity given the matter, though it has largely increased my work in attending to a host of correspondents, comprising friends, scientific men, applicants for positions on the expedition, enthusiasts, cranks, and others, has had advantages, in that it has brought to my attention special items of supplies and equipment of recent production which otherwise I should not have known of and which may be of much value. It has also made me acquainted with men whom it is a pleasure and an honor to know.

The wide-spread and entirely unexpected popular interest in my project has made it seem appropriate that I should comply with the request to take the public into my confidence, and tell details of interest, of my project and preparations. My project and theory is very simple, and can be stated briefly.

My party of six will be landed in June or early in July at Whale Sound latitude 77°. 30′ north.

The house will be erected at once, and the remainder of this season will be devoted to hunting for the winter's supply of meat, examining the features of the Whale Sound region, collecting natural objects, and more especially, to reconnoissances of the Inland ice in various directions.

It is anticipated that one of these reconnoissances will be carried across the great tongue of the Inland ice covering Prudhoe land to the

southern angle of Humboldt Glacier and an advance depot for the main sledge journey established there.

The winter will be occupied in making and fitting sledges, clothing, and all travelling equipment, and in snowshoe and skier practice, for which the level surface of Inglefield Gulf (head of Whale Sound) is especially adapted.

Early next spring four or five of the party will start over the Inland ice to Humboldt Glacier, with full sledges and dogs, if practicable. Should favorable advance be made, this party will continue on from Humboldt Glacier to the head of Petermann Fjord. Here a second depot of supplies will be deposited, and from this point the advance party of two or three will push on with full sledges, the others returning to Whale Sound, to devote their time during the absence of the main party to meteorological observations, collecting and surveying.

The main party will proceed from the head of Petermann Fjord to the head of Sherard Osborn Fjord, establish a depot there, thence to the head of De Long Fjord, establish a depot there, thence to the northern terminus.

This point reached and determined, the main party will retrace its steps to Whale Sound, taking up the various depots, and the entire party will then seize the first opportunity to come out.

The salient features of the project are the smallness of the party and the utilization of the great interior ice plateau, the imperial highway of inner Greenland, as a road, instead of the sea of ice, and the whole theory of the project rests upon the now well-established fact that the interior of south and middle Greenland is covered with an uninterrupted ice cap, and the more than probability (in my opinion) that in north Greenland the conditions are the same and the ice cap nearly, if not quite, coextensive with the land.

I recognize the fact that there are many ways in which the reality may vary from the above, and feel that when the elaborate and scientific theories of such eminent men as Dr. Petermann and Baron Nordenskjöld, as to conditions in the Arctic beyond the horizon of actual exploration, have been shown by subsequent exploration to be entirely erroneous, it is more than nonsense for a novice to predict what he will or will not find.

My personal impression is that the northern terminus of Greenland is not north of the 85° parallel of latitude, and that the inner ice cap is practically coextensive with the land; and this opinion is shared by Judge Daly and, I think, by most other eminent geographers.

But whether this is the case, or whether Greenland extends as an Arctic continent across the pole, or is connected more or less loosely by

detached masses of land with Franz Josef Land, or whether the ice cap ends at about the 82d parallel, as in Grinnell Land, I feel confident that in any contingency the efforts of my party will result in discoveries of interest, and, I hope, of considerable value to the scientific world.

Should the Greenland ice cap terminate at or south of the 82d parallel, as Gen. Greely believes, I shall endeavor to follow its edge to the unknown east coast above Cape Bismarck.

The especial advantages of my overland route over all others I regard to be as follows:

The possibility of laying a straight course from point to point, with the certainty that no tidal crack or chaos of heaped up ice will compel a long detour, or stop all further advance; that every foot travelled is a foot advanced, and the comforting assurance that nothing can happen to cut off the retreat.

The even and unvarying character of the surface to be traversed, and the gain in lightness of sledges and equipment, and rapidity of advance resulting therefrom.

The length of season (at least six months) during which sledging may be prosecuted.

The facilities that the "nunataks," or island mountain tops, which project above the "Inland ice" at distances varying from two or three to forty miles from the edge of the ice, offer for forming depots of provisions.

Depots placed on these "nunataks" are safe from the attacks of bears or other animals, and the "nunatak" itself forms a prominent landmark by which to recover the depot.

The exceptional value of the elevation of the route in accurately charting the coast and detecting the existence of more northerly land or lands. From the heights of the ice cap, with miles of the coast lying like a map below, it can be charted with an accuracy and rapidity unknown to one toiling from headland to headland along the sea-shore.

My base is the one advocated by Kane, Hayes, Hall, Judge Daly, and almost every American Arctic authority; a region having a small and kindly native population, abounding in game, and within easy reach of the whalers which pass Cape York every year, on their way to the fishing grounds in Lancaster sound and adjacent waters.

My proposed line of advance is absolutely direct throughout each stage. If it were not desirable to touch at the heads of Petermann, Sherard Osborn, and the other principal fjords which interrupt the northern coast, and determine their length and the characteristics of their heads, the line of march might follow very closely a great circle course from the head of Whale Sound to beyond Lockwood's "farthest."

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As to the dangers and hardships of an eighteen months' sojourn above the 77th parallel, sentiment and imagination aside, I believe them to be no greater than they would be in northern Norway, Siberia, the higher Alps, or, to come nearer home, in Montana or Dakota in winter.

It may be news to many to know that there are now in Greenland, under climatic conditions and environment, similar to those of my proposed headquarters, Danish officers with their wives and families, living the same home life as the better classes here, with their window gardens, their music, their books, and all the other accessories of culture.

Judge Daly, the distinguished President of the American Geographical Society, who has been actively interested in and intimately associated with every American Arctic expedition from Kane's to the present one, says:

"Peary's plan of exploration, which he has made known to me in writing, is a very judicious one, and, if carried out as he proposes, will in all probability be successful.

"An exploration of the Arctic for the purpose merely of reaching the North Pole is undertaking the accomplishment of simply a geographical feat; but an exploration of the Arctic in its entirety is something of practical importance, for until we know more than we do now of what takes place in the movement of the air and of the water in the Arctic we shall not acquire what we ought to know of the laws of aerial and oceanic currents, a knowledge of great importance for navigation as well as for other purposes.

"An essential part of this knowledge is the form and direction of northern Greenland. The late distinguished German geographer, Petermann, was of the opinion that Greenland was a continent that stretched across the whole of the Arctic, but I have never been satisfied with his reason. My own impression has been that the Arctic is an archipelago of islands and that Greenland is one, terminating not much further north than the furthest point reached by our own explorers; and Peary's projected exploration, from the direction he intends to take and the manner in which he proposes to conduct it, will, I think, settle that question, an important one in respect to the mass of waters in the Arctic and their movement and direction in connection with the motion of the earth."

I shall endeavor to collect all scientific material and make all observations practicable, but my first and last object will be the attainment and determination of the northern terminus of Greenland, and everything will be subservient to that.

THE MEMBERS OF THE PARTY.

I shall be accompanied by five young men, and the following particulars about the members of the party may be of interest:

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John M. Verhoeff, of Louisville, Ky., is a young man of 25, educated in an Eastern university, a mineralogist, and, though somewhat below the average in stature, has a magnificent lung development and a record for endurance and cross-country walking. Mr. Verhoeff has contributed generously to the expenses of the expedition.

Dr. Frederick A. Cook, the surgeon of the expedition, is an able young physician and surgeon, a native of New York State, a graduate of the College of Physicians and Surgeons and of the University of the city of New York, and has been in practice in New York City for several years. He is 26 years old, strongly built, height 5 feet 9 inches, weight 150 pounds, lung expansion 5 inches.

Langdon Gibson, of Flushing, L. I., is a stalwart young fellow of 26, and one of the many active and enthusiastic members of the American Ornithologists' Union. He was one of the Brown-Stanton party in the memorable Colorado Cañon survey of 1889–1890, and knows what arduous work is. He is six feet tall, weighs 178 pounds, and has an exceptionally fine lung development.

Eivind Astrüp, of Christiania, Norway, is a stalwart young fellow, who has but recently come to this country. He is the son of the commander of the Royal Civil Guard of Christiania, a first-class graduate of the Christiania Commercial College, and a winner of numerous prizes in athletic sports, especially ski-running. He is 5 feet 7 inches in height, weighs 167 pounds, and has a lung expansion of 4 inches.

Matthew Henson is a hardy young colored man, a native of Virginia, 23 years old. His intelligence and faithfulness, combined with more than average pluck and endurance, as shown during several years that he has been with me through varying experiences, part of the time in Nicaraguan jungles, lead me to regard him as a valuable member of the party.

The members of my party are all young, and, in addition to possessing first-class physique and perfect health, they are men of education and attainments. I believe this to be the type of man best fitted to endure with minimum effect the ordeal of the Arctic winter, and to effectively execute a two or three months' dash on sledges, where intelligent will-power, elasticity, and enthusiasm are at a premium over the stolid endurance of muscles hardened by years of work.

Mrs. Peary will accompany the party to Whale Sound. Possessed of youth, health, energy, and enthusiastic interest in the work, she sees no reason why she cannot endure conditions and environment similar to those in which Danish wives in Greenland pass years of their life. In this opinion I fully concur, and believe that in many ways her presence and assistance will contribute to the valuable results of the expedition, as they have been invaluable to me in the preparation.

FOOD SUPPLIES OF THE EXPEDITION.

The food supply of the party is not materially different from that of the later Arctic expeditions. Tea, coffee, sugar, and milk are in quantity sufficient to last two and a half years; other supplies for a year and a half. But little meat will be taken, outside of the pemmican for the sledge journey, as there is an abundance of reindeer, ptarmigan, Arctic hares, foxes, ducks, loons, seals, and walrus in and about Whale Sound.

Special items of interest, principally for the sledge journey, are as follows: Tea, compressed into one-fourth pound cakes, partially divided like chocolate, into one-fourth ounce squares. Each square, when broken off and crumbled up, will make a generous cup of tea. This tea was obtained from London, through the kindness of Mr. B. F. Stevens, so well known to navy men.

Compressed pea soup tablets, a German preparation. Each tablet contains pea meal, bouillon extract, and seasoning and, when crumbled and stirred into boiling water, will make a quart of nutritious and palatable soup.

Beef meal pemmican and beef meal and cocoa tablets, prepared expressly for the expedition. Both of these preparations are experimental, but there seems every reason to believe that they may prove a valuable addition to the menu of Arctic sledge parties. The beef cocoa tablets, it is anticipated, will be valuable as a lunch while marching, when it is not desirable to halt for a regular meal.

Evaporated cabbage, potatoes, onions, turnips, and carrots have been prepared expressly for the expedition. Evaporated apples and potatoes will form part of the daily bill of fare. The items marked * in the following provision list are all packed in rectangular sealed tins, containing twenty-five pounds net each, and two tins are packed in a close box. The gross weight of each box does not exceed seventy pounds, and every box and package is stencilled with its contents. Here is the provision list:

Tea,* coffee,* sugar,* condensed milk, hard bread,* corn meal,* rice,* hominy,* lard, pemmican, breakfast bacon, canned corned beef, salmon, baked beans, canned corn, canned peas, evaporated apples,* potatoes,* cabbage,* onions,* turnips,* and carrots,* canned tomatoes, assorted fruits, maple sugar, cranberry jam, compressed pea soup,* salt, chocolate, cocoa, corn starch, pickles, raisins, vinegar, pepper, ginger, mustard, cloves, cinnamon, nutmeg, lemon extract, vanilla extract, Worcestershire sauce, ketchup, hops, lime juice, yeast powder, Liebig extract, plum pudding, extract of coffee, beef meal pemmican, beef meal and cocoa tablets.

The sledge ration, unless experience suggests a modification, will con-

sist of pemmican, cranberry jam, hard bread, pea soup, tea, and condensed milk.

THE HOUSE TO BE BUILT AT WHALE SOUND.

Next to the food supply comes the house. This will be a light 12x20 structure (inside measurement) with double walls enclosing a ten-inch air space. There will be a triangular air space between the ceiling of the rooms and the roof sheathing, and the rooms will have three layers of tarred paper between them and the exterior air. The walls of the rooms will be hung at first with blankets, and later probably with skins.

The house will be surrounded by a wall of stones, turf, and snow as high as the eaves, leaving a narrow passage entirely around the house, and during the winter this space and the roof of the house itself will be covered in with a thick layer of snow.

THE EQUIPMENT.

The expedition will have two whale boats, built expressly for it, and supposed to be the best that can be made.

One of these, built by S. H. Mitchell of New Bedford, is 28 feet long, 6 feet beam, and 28 inches deep amidships. This boat weighs 800 pounds, and carries one sprit sail and a large jib. The other built by Reeves & Comstock, of New London, Conn., is 28 feet long, 6 feet beam, and 24 inches deep, and weighs 600 pounds. It has two masts, sliding gunter rig, and a jib. Both boats have white cedar planking and white oak frames and knees, and are fitted with steel keel shoes, and sleeping cuddies, and each has a rudder and tiller, a steering oar, five pulling oars, and a grapnel.

One of these boats has been named the *Mary Peary*, after the mother to whom I owe so much, whose prayers, if earnest human appeals have power to influence the Infinite, will bring the expedition back successful.

The other has been named the *Faith*, after the sturdy boat which thirty-six years ago brought Dr. Kane and his brave companions back to friends and civilization, past the same cliffs and bays that will know this new *Faith*. There will be several sledges, including the two made and used by me in Greenland in 1886. The new ones, though of the same type, will be lighter than the old ones.

Each member of the party will have Indian snow-shoes and Norwegian "ski," moccasins and rubber ice creepers. The alcohol stoves will be very light, with asbestos jacketed boilers. The sleeping bags will be of elk skin. All special clothing taken from here will be woollen fur clothing to be obtained at Whale Sound.

Special items are heavy grades of hygienic underwear, blanket com-

bination suits, blanket and knit mittens and socks, blanket coats with hoods, knit hoods, and heavy knit stockings.

Each member of the party will have a Winchester 44-calibre repeating carbine and a hunting knife. There will be also a Winchester 45-calibre repeating rifle, a Winchester repeating shot-gun, 10 gauge; a Daly three-barrel gun, shot barrels 10 gauge, rifle barrel, 45-calibre, and Colt's frontier revolvers.

The Winchester and Daly shot-guns take the same shell, the 45-calibre Winchester and the Daly rifle-barrel take the same cartridge, and the Winchester carbines and Colt's revolvers use the same cartridges.

The other articles of my equipment are as follows:

THE SURVEYING OUTFIT.

This comprises one traveller's theodolite, arranged expressly for the work, by Pauth & Co., with prismatic eye-piece, colored glasses, striding level, and 6½ inch vertical circle, reaching to 10 seconds.

One sextant, 7 inch, with artificial horizon and extra mercury.

One pocket sextant.

Three pocket half chronometers, made for the expedition by the Howard Watch Company.

One prismatic compass.

One sledge compass.

Seven pocket compasses.

Three aneroids, reaching to 12,000 feet.

One aneroid, reaching to 8,000 feet.

One aneroid, reaching to 3,000 feet.

One Henderson's self-registering pocket thermo-barometer, by Queen & Co., with set of extra thermometers by Green.

One one-hundred foot steel tape.

Two fifty-foot steel tapes.

Three odometers.

One field-glass.

Two spy-glasses.

One deep-sea thermometer.

METEOROLOGICAL OUTFIT.

One observatory barometer, Green, No. 2.

One hygrometer.

Four sets maximum and minimum thermometers.

Six special minimum thermometers graduated to—68° F.

Two special minimum thermometers graduated to—80° F.

Six mercurial thermometers.

One anemometer.

The photographic outfit consists of three kodaks, No. 4, 4x5, made for the expedition, and 2,000 films.

MISCELLANEOUS ARTICLES.

Oil stoves.

Japanese kiros.

Navy blue lights and signals.

Rockets.

Burning glasses, flint and steel, pocket lamps, and many other articles too insignificant to mention, yet of importance in a region where not even a piece of string or a paper of pins can be obtained.

THE VOYAGE TO WHALE SOUND.

The party will go from New York to Whale Sound in the steamer *Kite*, owned by Bowring Bros., of St. Johns, N. F. She will leave New York with the expedition on or about June 6. The *Kite* is a barkentine-rigged vessel, built for a whaler but used principally as a sealer. She can steam 7½ knots, and has been thoroughly overhauled and additional cabin accommodations put into her for the party.

She is a stanch, strong vessel, and is considered especially adapted for the voyage. After the North Greenland party is landed at Whale Sound she will be taken charge of by Professor Heilprin of the Philadelphia Academy scientific expedition for a two-months' scientific cruise in Arctic waters.

Although it is impossible to mention all to whom I am under obligations for courtesies and encouragement, I cannot omit to mention some to whom I am especially indebted.

To Profs. Lee and Young and the President and other members of the faculty of Bowdoin College, my alma mater, to Prof. F. W. Putnam of the American Association for the Advancement of Science, to Judge Daly, to President Adams and the Executive Committee of the Geographical Department of the Brooklyn Institute, to the late distinguished President Leidy and the Council of the Academy of National Sciences of Philadelphia, I am indebted for cordial and most valuable endorsement of my project.

To Secretary Tracy I am indebted for my leave, for his approval of my project, and for his kindly interest in my plans; and to Commodore Farquhar and Chief Engineer Melville, chiefs respectively of the Bureaus of Yards and Docks and Steam Engineering, for kindly offices which no others were in a position to render so effectively.

To the National Geographic Society I am under obligations for its interest in my work, and to the society and Miss Ulrica Dahlgren for a beautiful flag to be carried to the "farthest."

Though friends in the Portland Society of Natural History and others have accompanied their wishes for success with tangible enclosures, it is to the American Geographical Society, and particularly to the efforts of the active, enthusiastic members of the North Greenland Committee of the Philadelphia Academy of Natural Sciences, Profs. Leidy, Sharp, Heilprin, and Brinton, Mr. Hart, and Drs. Ruschenberger and McCook, that I am indebted for the sinews of war necessary, in addition to my own resources, to fit out my expedition.

And when the unlooked-for point blank refusal of the Dundee whaling companies and the director of the Greenland trade to give my party transportation to Greenland in any of their vessels, on any terms, made

it necessary to charter a vessel for the purpose, Prof. Putnam in behalf of his Department of Ethnography of the World's Fair, Mr. Verhoeff, and the organization by the Philadelphia Academy of a party of scientific men to make an extended scientific cruise, assured the additional funds necessary to meet the more than double expense.

To the press of the country I am indebted for its exceptionally friendly attitude toward my project. This fact has been as pleasant to me as it has been entirely unexpected.

R. E. PEARY, U. S. N.

WASHINGTON LETTER.

JUNE 15, 1891.

RESULTS OF THE CENSUS.—In the division of Mines and Mining of the Census Bureau some important features are developed in connection with several mining industries. The production of mica, for instance, is not at present a profitable industry in the United States. The capital invested ($691,550) yielded in 1889 less than $52,450 (at a cost of $58,335); a decrease of $313,525 since 1884. In the former year the price of cut mica was $2.50 per lb.; in the latter year about $1.00 per lb. The yield fell off chiefly because the demand changed from large to small sheets. The production of the latter description not being found profitable, many miners ceased operations, and consumers were compelled to look to foreign sources for supplies. The foreign supply, after gaining a foothold in American markets, more than held its own, and as its tendency has always been towards a reduction in prices, there has been little inducement for the outlay of domestic capital. Unmanufactured mica was imported into the United States in 1889 to the value of $97,351, nearly double the value of our own product. New Hampshire and North Carolina are the only localities in which the industry assumes any importance. Aside from the well-known use of sheet mica in stove panelling, it has of late years become im-

portant in the manufacture of electrical apparatus. Ground mica is used in the manufacture of a lubricant for journals and heavy bearings generally. It is also used in fancy grades of wall paper. In fact there is a greater range for the use of ground mica than for the mineral in sheets, with a probability that its use will be widely extended whenever mechanical genius has overcome some of the difficulties in grinding.

The production of native manganese ores increased from 4,895 tons in 1881 to 34,524 tons in 1887, since which it has declined to 23,927 tons (1889). More of the product is taken from the State of Virginia than from all the rest of the United States, and it is probably fair to say that the deposits of that State have produced more than any other mine in the world.

Petroleum was produced in eleven States in 1889, but of these Pennsylvania and New York yielded nearly nine tenths of the whole amount. Nearly the entire amount produced in California, Indiana and Ohio was used for fuel, while nearly the entire amount produced in Colorado, New York, Pennsylvania and West Virginia was used for illuminating purposes.

In studying the results of the last census one does not meet with so many surprises, if obvious causes are taken into the account. It is not difficult to understand, for instance, why the distinctive rural counties of New Jersey, such as Sussex and Hunterdon, show decreases in population, while Atlantic, Hudson, Passaic, Middlesex and Mercer, counties with urban populations, show increases varying from 92 to 138 per cent. The same is true of Connecticut, where by far the largest increase has been in the urban counties, such as Fair-

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field, New Haven and Hartford, although the percentage of increase in this State is much smaller than in New Jersey. In the State of Maine the decrease of rural population was so great that although, in the ten counties containing cities, the increases ranged from 7 to 50 per cent., the total population of the State increased but 1.87 per cent. Seven out of the sixteen counties show positive decreases.

Here are some of the results in these three States:

	1890.	1880.	PER CENT.
Newark, New Jersey	181,830	136,508	33.20
Jersey City, "	163,003	120,722	35.02
Paterson, "	78,347	51,031	53.53
Camden, "	58,313	41,659	39.98
Trenton, "	57,458	29,910	92.10
Hoboken, "	43,648	30,999	40.80
Elizabeth, "	37,764	28,229	33.78
Bayonne, "	19,033	9,372	103.08
Orange, "	18,844	13,207	42.68
Atlantic City, "	13,055	5,477	138.36
Passaic, "	13,028	6,532	99.45
Perth Amboy, "	9,512	4,808	97.84
Morristown, "	8,156	5,418	50.54
Bridgeport, Connecticut	48,866	27,643	76.78
New Haven, "	81,298	62,882	29.29
Hartford, "	53,230	42,015	26.69
Waterbury, "	28,646	17,806	60.88
Meriden, "	21,652	15,540	39.33
Norwalk, "	17,747	13,956	27.16
Norwich, "	16,156	15,112	6.91
New London, "	13,577	10,537	30.56
Portland, Me.	36,425	33,810	7.73
Lewiston, "	21,701	19,083	13.72
Bangor, "	19,103	16,856	13.33
Biddeford, "	14,443	12,651	14.16
Augusta, "	10,527	8,665	21.49
Waterville, "	7,107	4,672	52.12
Belfast, "	5,294	5,308	.....

GEOGRAPHY AND THE CENSUS.—Mr. Henry Gannett, the geographer of the Census, has evolved a good piece

of physical geography which might well be familiarized. He makes subdivisions of the country into areas differing in the character of their surface, their products and their climate. The subdivisions, beginning at the Atlantic coast are, in the order named :

Coast Swamps,	Prairie Region,
Atlantic Plain,	Great Plains,
Piedmont Region,	North Rocky Mountain,
New England Hills,	South Rocky Mountain,
Appalachian Mountain Region,	Plateau Regions,
Cumberland-Allegheny Plateau,	Basin Regions,
Interior Timbered Region,	Columbian Mesas,
Lake Region,	Sierra Nevada,
Ozark Mountain Region,	Pacific Valley,
Alluvial Region of the Mississippi.	Cascade Range,
	Coast Ranges.

The characteristics of the divisions are briefly these :

The COAST SWAMPS are found along the South Atlantic and Gulf coasts, extending inland to varying distances, in some places as much as a hundred miles. Their greatest breadth is in North Carolina and Louisiana, but they border nearly the whole coast from southeast Virginia to the Rio Grande in Texas. The population is mainly of the colored race.

The ATLANTIC PLAIN is a strip lying between the coast swamps and the fall line throughout the Atlantic States south of New York, and the Gulf States as far as the Mississippi. The surface is level, and the elevation scarcely reaches 200 ft. above the sea. Largely covered with fine forests. Underlaid by recent sedimentary rocks.

The PIEDMONT REGION extends from Maine to Alabama, between the fall line on the east, and the Blue

Ridge on the west. Forested with a mixed growth, and underlaid by metamorphic rocks.

The NEW ENGLAND HILLS include the hill country in the upper part of New England, and the Adirondacks of New York. Elevation from one to six thousand feet. Covered with forests.

The APPALACHIAN MOUNTAIN REGION extends from New Jersey to Alabama, and includes the Blue Ridge and the Appalachian valley north and west of it.

The CUMBERLAND-ALLEGHENY PLATEAU is the escarpment-region which rises from the northwest border of the Appalachian valley, extending more or less continuously from northeastern Pennsylvania down to Maryland, Virginia, and Tennessee into Alabama. This plateau is deeply scored by streams with a general northwesterly direction. The streams have cut the plateau into a mass of very irregular ridges and gorges, making it one of the most intricate mountain regions on the globe. The whole region is densely covered with forests.

Southern Ohio and Indiana, the western half of Kentucky and Tennessee, and the northeastern part of Mississippi, with small areas in adjoining States, comprise the INTERIOR TIMBERED REGION.

A narrow strip of country bordering on the great lakes has been segregated under the name of LAKE REGION. It includes small parts of New York, Pennsylvania and Ohio, and most of Michigan, Wisconsin and northern Minnesota. This region has many of the characteristics of a coast climate.

The OZARK MOUNTAIN REGION is located in north-

west Arkansas, southwest Missouri, and the eastern part of Indian Territory.

From Cairo, at the mouth of the Ohio to the coast swamps in Louisiana, including parts of Missouri, Arkansas, Mississippi and Louisiana with small areas in Kentucky and Tennessee, extends the ALLUVIAL REGION OF THE MISSISSIPPI. Most of it is marshy, and below the level of the river waters. The dry land is mainly along the immediate banks of the streams. Inhabited mostly by the colored race.

The PRAIRIE REGION comprises a small portion of western Indiana, most of Illinois and Iowa, southern Wisconsin and Minnesota, northern Missouri, eastern Dakota, Kansas and Nebraska, and a broad belt through Indian Territory and Texas. It is the granary of the country, and merges on the west into the GREAT PLAINS which extend from approximate Longitude 99° to the foot of the Rocky Mountains and from Canada to the Rio Grande. In this latter region the rainfall is insufficient for the needs of agriculture.

The CORDILLERAN REGION and ROCKY MOUNTAIN REGION (North and South Rocky Mountains) are located in Washington, Oregon, California, Nevada, Arizona, Idaho, Montana, Wyoming, Colorado, New Mexico. The climate in some parts is very arid, and in other parts very moist. The prevalence of forests accompanies the rainfall. In some sections the forests are very dense, and the trees of enormous size.

The region of great PLATEAUS, whose surfaces are level or slightly inclined, and terminate in great lines of cliffs in some cases thousands of feet in height, is located in the drainage basins of the Colorado, above the mouth of

the Virgin River in southern Nevada. These plateaus descend from the mountains by a succession of gigantic steps from an elevation of 12,000 feet down to one or two thousand feet above the sea. Every stream is in a cañon. The higher plateaus are green, the lower are absolutely sterile.

The BASIN REGION, which has no drainage to the sea, is in the interior of the Cordilleran region already described, and comprises practically all of Nevada, western Utah, part of eastern California, and southern Oregon. It is a closed basin, and only discharges its waters by sinking them into the thirsty soil, or by evaporation. The rainfall is so scanty that there are but two or three running streams of any magnitude within it. In the eastern part the largest basin is that known as the Great Salt Lake. In the western part the principal basin is that of the Humboldt River. The elevation of the floor of the basin ranges from 6,000 feet near its middle line, downward, reaching in *Death Valley* in eastern California an elevation of 200 feet below the level of the sea.

The drainage basin of the Snake River in Idaho, Oregon and Washington, together with a part of the basin of the Columbia in the latter State, has been in great part caused by eruptions of basalt, which, bursting out of the soil at various points, has spread over the country, forming table-lands, which are named the COLUMBIAN MESAS.

Separating the Great Basin from the California valley in eastern California, is a broad, heavy forest-covered range of mountains with long slopes to the west and an abrupt ascent to the east,—the SIERRA NEVADA.

The PACIFIC VALLEY, so-called, is west of the Cas-

cade range and the Sierra Nevada, and stretches from Puget Sound to southern California. It is drained in Oregon by the Willamette and in California by the Sacramento and San Joaquin rivers.

Stretching northward in line with the Sierra Nevada, but distinguished sharply from it by the high character of its formation is the CASCADE RANGE. It is a series of extinct volcanoes, rising from a high plateau of volcanic rock.

Separating the Pacific valley from the Pacific is a succession of ranges trending parallel with the coast and known as the COAST RANGES. In southern California the valleys among these ranges are of the highest degree of fertility, and produce grapes and tropical fruits in profusion.

Mr. Gannett has prepared a table showing the distribution of population in 1870, 1880, and 1890 in accordance with these topographic features. Grouping the subdivisions, the table shows that 4.3 per cent. of the population is found in the swamp regions, including in that term the coast marshes and the alluvial region of the Mississippi River;—mainly the colored race. In the desert and semi-desert regions 2.3 per cent. In the mountain region of the west about 2.5 per cent., while the eastern mountain region contains about one-sixth of the entire population.

Another table prepared by Mr. Gannett shows the population of the country by square degrees, that is to say, by areas included between consecutive parallels and consecutive meridians. The square degrees between latitudes 39° and 43° and longitudes 71° and 76° contain about one-tenth of the population.

In two of the Census bulletins (Nos. 35 and 60) treating of irrigation in Arizona and New Mexico, the natural features of these territories are detailed with minuteness, including descriptions of the counties, courses of rivers and streams, elevations, etc. Mr. F. H. Newell is charged with the preparation of these papers.

REVISION OF GEOGRAPHIC NAMES.—In his last annual report the Hydrographer of the Navy Department, in speaking of the desirability of a uniform system of spelling geographic names in charts and sailing directions, said: "A board has been for some months investigating the subject with a view to such modifications of the Admiralty system as will render it appropriate for adoption, or, at its discretion, to report an original method, if necessary. For some time we have been in communication with all foreign hydrographers, examining into their methods, and much valuable information has been received, and it is hoped that the results arrived at will soon be ready for publication."

The board, which was organized in February, 1890, consisted of Lieut. Charles M. McCarteney, U. S. N., Chief of Division of Sailing Directions; Mr. Boynton Leach, Assistant, the editor of *Notices to Mariners*, and Mr. Gustave Herrle, Chief draughtsman.

The report of this Board (Hydrographic Office Publication No. 98) has just been published for the consideration of the United States Board on Geographic Names.

In order to learn the uses prevailing in foreign countries, a circular letter was addressed to hydrographic offices, and to various geographic societies and individuals. Replies were received from the hydrographers

of Great Britain, France, Spain, Chile, Netherlands, Netherlands-India, Italy, Japan, the Secretary of the German Marine, the Marine Department of Ottawa, the Coast Pilot Bureau of Austria-Hungary, the Archive of Sea Charts of Denmark, the Inspector-General of the Imperial Chinese Customs Service, the United States Ministers to Greece and Mexico, and several others. This correspondence, which is published with the report, will be of great use in determining the correct usage of foreign geographic names, and, where other than Roman characters are used, what are the proper equivalents for transliteration.

Efforts have been made to eradicate the existing confusion by the adoption of fixed systems of orthography on the part of the hydrographic offices of Great Britain, France and Germany. The British system was adopted in 1885 by both the Hydrographic Office and by the Royal Geographical Society. M. Bouquet de la Grye, in behalf of a commission appointed by the Société de Géographie, reported in 1886 a system largely formulated after the British, and the German Hydrographic Office adopted rules in 1888 which also closely follow the British system.

An examination of these three systems discloses the fact that they divide all geographic names into two classes, on the following propositions: 1. Geographic names originating in languages that are written in Roman character should be spelled as in the country having jurisdiction. The French and German systems allow exceptions to this rule in the case of names which, through long custom, have become generally known in another form. 2. Geographic names origin-

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ating in languages without literature, and in languages that require transliteration into Roman character, should have their spelling based on the true sound of the word, as locally pronounced. In regard to the phonetic values of the letters in names of the second class, the report says that the three systems show a remarkable agreement resulting from the adoption by the British of the Italian or continental vowel sounds, and from the adoption to a very large extent of the English consonantal sounds by the French and German Hydrographic Offices. All three systems, however, permit exceptions in names of class 2, where long used orthography, though it may not be in accordance with adopted rules, has become generally familiar. The three systems also recognize the futility of providing for the more delicate inflections of sound and accents in foreign names of class 2, by discarding diacritical signs, the British and German systems confining themselves to the use of the acute accent, and the French retaining only the circumflex accent (^) and the apostrophe (').
The American system, as will be noticed further on, also discards, or at least says it is desirable to avoid, the use of diacritical characters.

As far as is known, none of the other hydrographic offices have as yet any fixed system of orthography in use, unless Spain is excepted, whose Hydrographer has outlined a system, based mainly on that of the French, which is intended to be adhered to in future Spanish Hydrographic Office publications.

The Report says: "The difficulties in the way of practical application of these systems are various and many, and not the least is the uncertainty existing in re-

gard to the correct local pronunciation of many of the names in distant foreign lands, that use another than the Roman character in their writing. Where the local pronunciation of the name is absolutely known, it may be readily spelled under the general system, but where the written form only is available, detailed systems in harmony with the general system can be advantageously used for transliterating and thus assist in bringing about the ultimate object. The Board has prepared such systems for application to Russian, Greek, Japanese and Korean geographic names, and has formulated rules and data, as far as possible, for guidance in treating Malay and Chinese names."

In regard to the names of India the Board recommends a close adherence to the forms found in Hunter's Imperial Gazetteer of India, the best authority available. The Board submits the following

STANDARD RULES.

(a) The more prominent geographic names, the orthography of which is already fixed by universal adherence to a certain form, or which are spelled in *but one way* in American and English literature, shall not be changed, although their spelling may not be in accordance with rules (b) and (c). Examples: Athens, Bombay, Ceylon, Germany, Spain, St. Petersburg.

(b) Geographic names in countries which use the Roman or Gothic characters in writing their language shall be rendered in the form found in the latest official publications, maps and books of the country having jurisdiction. In cases, however, where the form of a place-name hitherto used is so different from the official

form that the identity of the latter with the former might not be recognized, the old form shall be added in brackets; as, for instance, Livorno (Leghorn), s'Gravenhage (The Hague), Wien (Vienna).

Where there is a conflict of jurisdiction, as it were, over a geographic name as, for instance, in the name of a body of water separating two or more countries, or as in Polynesian or African names, rule (a) or (c) shall be applied. Thus, Swedish and Norwegian *Skagerak*, Danish *Skagerrak* is an example where choice lies only in the spelling, and under rule (a) preference is given to double r, Skagerrak; but in the Baltic (*Baltiskoe More, Baltisches Meer, Ostsee, Östersjön, *Óstersóen*) the choice lies first in the proper name, and Baltic is retained under rule (a), while the Dutch, Spanish or other rendering of Polynesian names must be treated under rule (c) if not in accord with the general system.

(c) Geographic names from languages that require transliteration into Roman character, and geographic names originating in languages without literature, shall have their spelling based on the true sound of the word as locally pronounced, and in accordance with the general system of sound equivalents given below.

On account of the difficulties inherent in the English language, an approximation to the true sound is alone aimed at in this system, the principal characteristic of which is that all vowels are pronounced as on the continent of Europe generally, and all consonants as in English:

* The accented *ó* represents the last letter in the Danish alphabet.

Letters.	*Sounds.*	*Example.*
a	ah, a as in father	Java, Banána, Somáli, Bari.
e	eh, e as in men	Tel el Kebír, Oléleh, Medina, Levuka, Peru.
i	English e; i as in ravine; the sound of ee in beet. Thus, not Feejee, but	Fiji, Hindi.
o	o as in mote	Tokyo.
u	long u as in flute; double o, as in boot. Thus, not Zooloo, but	Zulu, Sumatra.
	All vowels are shortened in sound by doubling the following consonant	Yarra, Tanna, Jidda.
	Doubling of a vowel is only necessary where there is a distinct repetition of the single sound	Nuulua.
ö	German ö (œ)	Töchön.
ü	The French sound of u (ü); or the German ü (ue)	Bökrüt.
ai	English i as in ice	Shanghai.
au	ow as in how. Thus, not Foochow, but	Fuchau.
ao	is slightly different from above	Nanao.
ei	is the sound of the two Italian vowels; but is frequently slurred over, when it is scarcely to be distinguished from ey in the English they	Beirút, Beilúl.
b	English b.	
c	is always soft and nearly the sound of s; the hard c is given by k	Celébes.
ch	is always soft, as in church	Chingchin.
d	English d.	
f	English f; ph should not be used for the sound of f. Thus, not Haiphong, but	Haifong, Nafa.
g	is always hard (soft g is given by j)	Galápagos.
h	is always pronounced when inserted.	
j	English j. Dj should never be put for this sound	Japan, Jinchuen.
k	English k. It should always be put for the hard c. Thus, not Corea, but	Korea.
kh	the Oriental guttural	Khan.
gh	is another guttural, as in the Turkish	Dagh, Ghazi.
l, m, n	as in English.	
ng	has two slightly different sounds, as in finger, singer.	
p	as in English.	
q	should never be employed; qu is given by kw	Kwangtung.
r s t v w x	as in English	Sawákin.
y	is always a consonant, as in yard (Kikuyu), and therefore should not be used for the vowel i. Thus, not Mikindány, but	Mikindáni.
z	English z	Zulu.
	Accents should not generally be used, but where there is a very decided, emphatic syllable or stress which affects the sound of the word it should be marked by an acute accent.	Tongatábu, Galápagos, Paláwan, Saráwak.

The above system of sound equivalents is substantially the same as that adopted by the United States Board on Geographic Names which was organized in April, 1890, and formally created by an Executive order September 4, same year. Let it not be misunderstood that there are two boards on geographic names. This report of the board of the Hydrographic office has been published for the consideration of the U. S. Board on Geographic Names, to which it has been submitted. All the chart and map producing countries are now practically in accord in their rules for geographical nomenclature.

The United States Board of Geographic Names having recently formulated additional guiding principles determining the official form or rendering of geographic names, the whole are here introduced as a matter of general interest.

1. That spelling and pronunciation which is sanctioned by local usage should in general be adopted.

2. Where names have been changed or corrupted, and such changes or corruptions have become established by local usage, it is not in general advisable to attempt to restore the original form.

3. In cases where what was evidently originally the same word appears with various spellings sanctioned by local usage, when applied to different features, these various spellings should be regarded as in effect different names, and as a rule it is inadvisable to attempt to produce uniformity.

4. Where a choice is offered between two or more names for the same place or locality, all sanctioned by local usage, that which is most appropriate and euphonious should be adopted.

5. The possessive form should be avoided whenever it can be done without destroying the euphony of the name or changing its descriptive application.

6. In all names ending in *burgh* the final *h* should be dropped.

7. In all names ending in *borough* this termination should be abbreviated to *boro.*

8. The word *center* as part of the name should be spelled *center* and not *centre.*

9. The use of hyphens in connecting parts of compound names should be discontinued.

10. The letters C. H. (Court House) as part of the names of county seats should be omitted.

11. In the case of compound names consisting of more than one word it is desirable to simplify them by uniting the compound parts.

12. It is desirable to avoid the use of diacritical characters.

13. It is desirable to avoid the use of the words *city* or *town* as a part of names.

The last eight are recent conclusions, and are important.

The Board has issued its second Bulletin containing 204 revisions of American, and 39 of foreign names. Number three will contain a corrected list of light-houses and light-house stations; and number four a list of all counties in the United States.

Lieut. Richardson Clover, the Secretary of the Board, who has been acting Hydrographer of the Navy Department since September last, has been appointed Hydrographer in fact and promoted to the grade of Lieutenant Commander.

The Hydrographic Office will soon publish a Track and Distance Chart of the World. Also, the report of observations recently made for magnetic declination, dip, and intensity, by Lieutenants Norris and Laird, and Ensigns Holcomb, L. M. Garrett, Wilson and Wood. They furnish valuable results at Vera Cruz, Coatzacoalcos, Salina Cruz, Puerto Plata, Curaçoa, and La Guayra.

The last two issues of the Pilot Chart of the North Atlantic (May and June) contain graphic daily record of the magnetic declination, or variation of the compass at Washington. The curves indicate the true direction in which the magnetic needle at the Naval Observatory pointed during each instant from noon, March 29, to noon, May 31. It is proposed to continue the publication of these curves for at least three months, and any questions regarding them will receive immediate consideration and reply. They are carefully copied and reduced one-quarter from the photographic record at the U. S. Naval Observatory. The magnetic work is in charge of Ensign J. A. Hoogewerff, U. S. N.

The current year is the eighth in the publication of the Pilot Chart, the first issue having appeared in December, 1883. The various changes and improvements that have been made in the Chart since that time are strikingly shown by a comparison between a late copy and that first issued. The most conspicuous additions are the following: Steam and sailing routes; region of equatorial rains; table of barometer normals and percentage of probable calms for each 5°-square; storm diagrams, with brief rules for action to avoid a hurricane; cautionary and storm signals in use along

the Atlantic and Gulf coasts of the United States; the tracks, names and dates of derelicts; list of dangerous obstructions to navigation along the coast, and of charts published and cancelled during the preceding month; regions of observed and predicted fog. Besides these additions, and other less striking ones, the greater portion of the forecast meteorologic data have been thoroughly revised and brought up to date, while the review is now prepared with very much greater accuracy and completeness, owing to the far greater number of observers who now send in regular reports and the hearty approbation and support received from masters of vessels of every nationality.

A feature of the Pilot Chart that deserves special mention is the occasional publication of a Supplement devoted to some subject of immediate importance. This plan was first tried in September, 1887, and since that time eight supplements have been issued, each of which has attracted much favorable attention, and has been widely quoted. The following is a complete list of those published thus far:

September, 1887.—West Indian Hurricanes. Diagrams and text explaining the circulation of the wind in a hurricane, with brief rules for action.

December, 1887.—Trans-Atlantic Steamship Routes for December. The plan for steamer-routes recommended in order to avoid collisions, with a brief discussion of the winter storm-belt of the North Atlantic.

March, 1888.—Waterspouts off the Atlantic Coast of the United States during January and February, 1888. Positions of waterspouts plotted on a small chart, with reports quoted in full and a discussion of the subject.

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August, 1888.—Derelicts and Wreckage in the North Atlantic. A history of the great log-raft, with a complete list of reports received from vessels that sighted the logs as they spread over the ocean, together with a graphic record of the drifts of the most notable derelicts.

February, 1889.—The Derelict American schooner *W. L. White.* An account of the transatlantic voyage of this notable derelict vessel, with all reports received and a chart showing the track of the vessel and the general drift of Atlantic currents.

October, 1889.—The St. Thomas-Hatteras Hurricane of Sept. 3–12, 1889. Ten small charts, with accompanying text, illustrating the progress of this great hurricane from St. Thomas to our coast north of Hatteras, with a complete list of vessels from which reports were received in time for use in this connection.

During 1890, no supplements were issued, but a large number of reprints, in black and white, were made of the various diagrams and printed matter accompanying the Chart. These have been widely circulated and republished.

January, 1891.—Ice in the North Atlantic during the season of 1889–90. This chart shows the positions and dates of icebergs and field-ice reported during the past season (perhaps the most notable ice season on record).

Dr. John B. Hamilton.—The Government loses the services of a valuable officer in the resignation of Dr. Hamilton, until lately supervising surgeon-general of the Marine Hospital service. Dr. Hamilton is a gentleman of many accomplishments, and possesses moreover executive abilities of a very high order. He leaves the impress of intelligent and con-

scientious work on the department over which he has presided since 1875. The high position of this service is recognized everywhere; and to no one is this due more than to its late executive officer.

The salaries of government officers are specifically provided for by law, and it is a very difficult matter (except as to political officers) to procure readjustment based on altered conditions, or increased responsibilities. So, it not infrequently happens that in some particular service of the government duplicated in kind elsewhere, the promoters offer compensation in harmony with the advanced requirements of such service. There is scarcely a department of the government (notably those employing scientific skill and experience) that does not suffer in competition with local institutions all over the country.

Dr. Hamilton has accepted the position of professor of surgery and surgical pathology in Rush Medical College, Illinois, considered one of the finest in the West in the line of surgery.

Dr. Walter Wayman, a graduate of Amherst College, and for some time chief assistant, has been appointed to succeed Dr. Hamilton.

The marine hospital service for the care of sick and injured American seamen, originated in 1798. It supervises all United States marine hospitals, twenty additional government hospitals, and a large number of relief-stations (about 135) where medical aid is given to seamen of the merchant marine. Officers of the service examine pilots who apply for license; and crews and keepers of life-saving stations. It treats officers and crews of the revenue marine service. It is

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charged with the management of the eight national quarantine stations, and the execution of rules under the interstate quarantine law recently enacted, and more important still, under the immigration act passed by the last Congress, its medical officers are charged with the inspection of immigrants and with the necessary certification regarding those who are not allowed to enter the country.

The service publishes an annual report, regulations, lists of medical officers, weekly abstract of sanitary reports, and occasionally a paper on some special subject.

IMMIGRATION.—The "Immigration Act," so called, passed at the last session of Congress, established in the Treasury Department the office of superintendent of immigration, and the President is authorized and directed to appoint such superintendent, with the advice and consent of the Senate. The Hon William D. Owen, of Logansport, Indiana, has been appointed to this office. Mr. Owen, who was a member of the 51st Congress, is largely responsible for the passage of this important measure. The act took effect April 1, 1891. It prohibits the landing in the United States of the following classes of aliens:

1. Idiots.

2. Insane persons.

3. Paupers, or persons likely to become a public charge.

4. Persons suffering from a loathsome or dangerous contagious disease.

5. Persons who have been convicted of a felony or other infamous crime or misdemeanor involving moral

turpitude, not including persons convicted of political offenses only.

6. Polygamists.

7. Persons coming under contract to labor.

All corporations and others bringing into the United States aliens, falling within any of the prohibited classes, are required under heavy penalties to return them at their own cost, to the ports or countries whence they came, and this requirement holds good for *one year* after any such prohibited alien may have entered the United States. The "contract to labor" provision does not apply to ministers of any religious denomination, nor to persons belonging to any recognized profession, nor to professors for colleges and seminaries. All alien immigrants upon their arrival must be reported to the proper inspection officers. Medical examinations will be made by the surgeons of the Marine Hospital Service. Decisions made by the inspection officers adverse to the right of the alien to land shall be final, unless appeal be taken to the superintendent, whose action shall be subject to review by the Secretary of the Treasury. Any alien who becomes a public charge within one year after his arrival from causes existing prior to his landing shall be deemed to have come in violation of law, and shall be returned as aforesaid.

The Secretary of the Treasury has appointed a commission to proceed to Europe for the purpose of investigating various aspects of immigration; such as, the reasons for the outpouring from southern Europe, the character of the emigrants, municipal or society aid, whether the deportation of defective classes is encouraged, etc. The commission as at present constituted

consists of Dr. Walter Kempster, Judson N. Cross, Joseph Powderly, and H. J. Schulteis, the latter as a representative of the Federation of Labor.

The *Star*, a Washington newspaper conducted with conspicuous ability, advances as an important consideration to account for the large immigration to this country, the fact that the debt of many leading foreign nations is increasing as that of the United States steadily decreases. The tabulated statement prepared by the Census Bureau for the decade of 1880 to 1890 shows that the former has increased more than two thousand million dollars ; the latter has decreased half that amount. The fact that this heavy increase of foreign indebtedness is due largely to preparation for war furnishes a further inducement to seek a land of peace and comparatively small national expenditures. An examination of the per capita debt of the various countries illustrates the comparative statement. The United States debt decreased from $38.33 to $14.63. Great Britain's per capita debt is $87.79 ; that of France $116.35 ; Russia's is only $20.79." (The figures do not help the argument of the *Star*. There is practically no immigration from France.)

Explorations in Alaska, Etc.—Mr. Israel C. Russell of the United States Geological Survey is the chief of a small party recently sent to Alaska under the auspices of the National Geographic Society to explore further the region about Mt. St. Elias. The Geological Survey, the Revenue Marine Service, the Fish Commission, and the Coast Survey, to the extent of affording facilities at least, are co-operating, so that, utilizing the information derived from last year's

experience in the same region, valuable results are confidently expected. In order to have the shortest possible land route, the approach to the country will be from the south by way of Icy Bay instead of from the east by way of Yakutat Bay as last season. This will avoid the loss of much time and energy. The ascent of Mt. St. Elias and study of the unmapped country to the north and west of it are primary objects. Co-relatively will be an examination of the great Malaspina glacier, and a more extended exploration of Yakutat Bay.

Mr. Marcus Baker of the National Geographic Society says that owing to last year's explorations the region between Yakutat Bay and Mount St. Elias had been charted in considerable detail, showing the assemblage of ranges, the association of peaks and the system of glacial formations, all running generally on the west side of the Coast Range down to the sea, or rather to the Malespina glacier.

Mr. Frederick Schwatka, with whom is associated Mr. C. Willard Hayes of the Geological Survey, is now in Alaska surveying the country north of the Mt. St. Elias range, and between the head waters of the Yukon and White Rivers. It is the intention of these gentlemen to ascend the Taku River and then make portages across to the lakes, thence to the head waters of the Yukon and by portage to Copper River, whence they will make their way to the Pacific Ocean.

After Lieut. R. E. Peary had explained to a public audience in Washington recently his projected expedition towards the vague northern limit of Greenland, he was presented with a silk flag of the United States, with the request that when he sets foot upon the farthest

north he plant there the banner of his country and then return it to the National Geographic Society. The flag had been placed in the hands of the Society by Miss Ulrica Dahlgren.

The Postmaster-General has authorized the establishment of a very complete mail service with the Territory of Alaska, which will be inaugurated July 1, the contract having been awarded to the North American Commercial Company, San Francisco, which will put on a line of steamers running as far west as Unalaska, touching at all the intermediate ports. The distance from Port Townsend to Unalaska is 2,400 miles and from Sitka to Unalaska 1,300 miles. This service will bring into contact with civilization a vast extent of country, and people who have heretofore been debarred from communication with the United States except by means of a chance sailing vessel.

Apropos of the above, a letter was mailed at Juneau on the 1st of June and reached Washington, D. C., on the 11th of the same month.

INTERCONTINENTAL RAILWAY.—The intercontinental railway commission is an outgrowth of the recent International American Conference. The Commission after a session in Washington of several weeks' duration has adjourned until next February. Its first report has been presented to the Secretary of State. It says: A line of railroad is projected and has been surveyed from the City of Mexico to Ayutla, on the frontier of Guatemala. From Ayutla the line determined upon runs parallel with the Pacific Coast through Mazatenango to Santa Lucia, thence by Cuajiniquilapa to Santa Ana, in Salvador; thence through Nuevo

San Salvador and San Miguel to Goascoran in Honduras.

From Goascoran the line will continue along the Gulf of Fonseca, through the State of Choluteca to the city of the same name; thence through Chinadega in Nicaragua to Rivas, and along the shore of Lake Nicaragua, through Alajuela in Costa Rica, and on through San José to Puerto Limon, and thence down the isthmus of Panama to the valley of the Atrato in Colombia.

In Colombia the line will cross the western cordillera of the Andes into the valley of the river Cauca and up this valley to Popayan. A trial line for a branch road will be run from the main line to the city of Bogotá.

From Popayan the line will cross the mountains to Pasto, and thence continue through Ecuador by the cities of Tulcan, Ibarra, Quito, Cuenca and Loja and into Peru.

Through Peru the line selected will pass through the provinces of Cajamarca and Amazonas and to the river Marañon, and through its valley to Cerro de Pasco; thence along the river Perene and on to Santa Ana; thence to Cuzco, Santa Rosa and Puno, and along the shore of Lake Titicaca to the Bolivian frontier.

In Bolivia the line will pass through the cities of La Paz and Oruro to Huanchaca, where the main line will terminate. From Huanchaca, Chile, the Argentine Republic, Paraguay and Uruguay can be reached by branch lines.

Venezuela will be connected with the trunk line by a branch from the most suitable point in the valley of the Cauca to Medellin, where it will connect with an existing railroad to the city of Puerto Berrio, on the Mag-

dalena River, and continue through Bucaramanga, San Jose de Cucuta and Merida to Valencia.

It is hoped, the report says, that the work allotted to the several parties can be completed within a year, and the main question as to whether the projected railway is practicable will have been determined.

Letters have been received from the three surveying parties, showing that their destinations have been reached. It is not thought that these parties will get back to this country for over a year.

Information has been received from Buenos Ayres to the effect, that the Trans-Andine railway between Buenos Ayres and Valparaiso is now open for traffic with the exception of the distance between Mendoza and Uspallata, 56 miles. The tunnel through the mountain, 10,500 feet above the sea, is very well along, and is expected to be finished during the present year.

HERNANDO CORTES.—The monument to the conqueror of Mexico was unveiled in his native city of Medellin, Spain, on the 2d of December, 1890. The statue was erected by the municipality, aided by contributions from the Senate and chamber of deputies of Spain. The sculptor is Eugenio Barron. The monument stands in the centre of a square formerly occupied by the Cortes homestead. It stands about ten feet high and represents Cortes in the full military dress of the period, carrying in his right hand the staff of command, and in his left the flag of Castile and Leon. The pedestal is a massive stone structure in the shape of a fifteenth century fortress, and bears on its four sides representations of broken Aztec weapons, with the inscription: Mexico, Tlascala, Otumba, Tabasco. On the front of the pedes-

tal appears the name "Hernan Cortes," and the coat of arms which Charles V. granted him on his return from Mexico.

The Department of State has in preparation several valuable reports from American consuls abroad on several specially valuable topics:

Straits and highways of the world.

Canals and navigation in foreign countries.

Tariffs of the world.

Gas and gas manufacture in foreign countries.

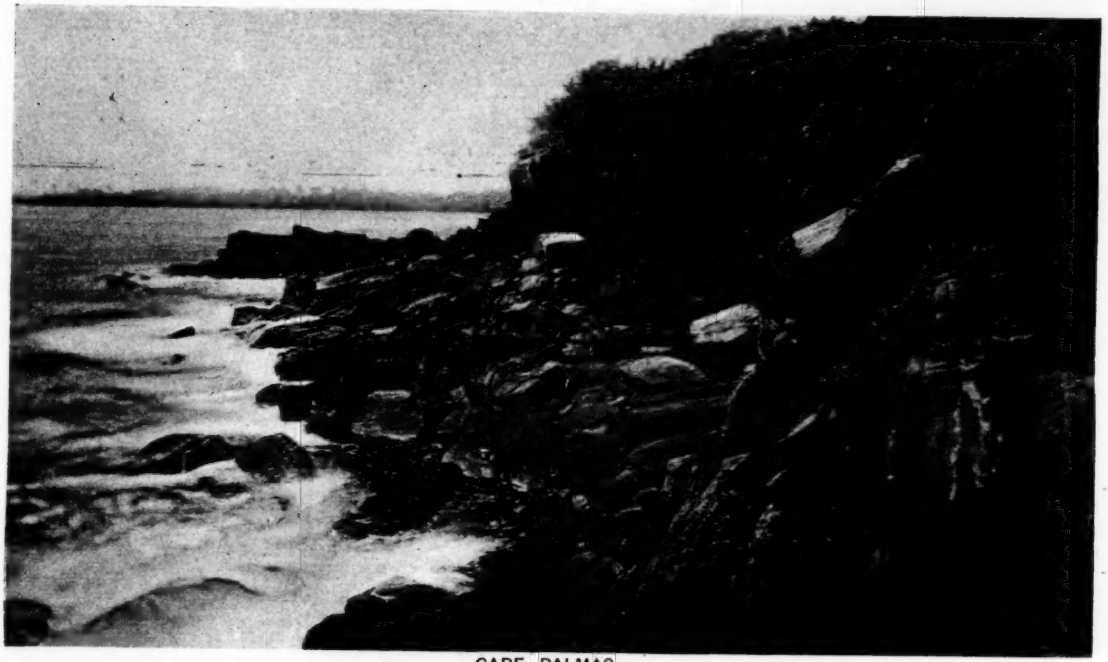
Port regulations, light-houses and quarantines of the world.

Coal trade and coal production in Spanish America.

Rubber trade and rubber trees.

Lead and zinc mines and trade.

H.



CAPE PALMAS.